THE COMPLETE HOUSE BUILDER

WITH HINTS ON BUILDING

Containing 88 Plans and Specifications of Dwellings, Barns, Churches, Public Buildings, Etc.

Adapted to all Conditions of Town and Country
Ranging in Cost from $476 to $10,000 for Dwellings

M. A. DONOHUE & CO., CHICAGO

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BY

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FULLY ILLUSTRATED

M. A. DONOHUE & COMPANY

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INTRODUCTORY.

The subject of house-building is of interest to all, even though, financially, they are at present unable to build. A few months or a year may, however, in this progressive city so change the aspect of affairs as to render it possible. It is, therefore, well for all to anticipate the realization of a *home*, and become familiar with the requisites of a good house. All who intend to build fully realize the importance of first knowing what can be and what ought to be done, in selecting a site, planning the rooms, building, furnishing and beautifying a home in the most economical and satisfactory way, that the whole, when complete, shall be to its possessor a beautiful, charming resort.

The object of this little treatise is to present only the most important facts about building *as hints;* the suggestions are the result of practical experience, though all of them are not applicable to any one building. There are many ways of doing things omitted which are perhaps quite as good, but these will be found practical, and perhaps prove a reminder of many things overlooked or forgotten, and as such they are respectfully tendered for what they are worth to the reader.

PRESS NOTICES.

HINTS ON BUILDING.—By J. H. Carpenter, Architect, of Chicago.

This little pamphlet is written for the purpose of giving to the non-professional engaged or interested in building, some familiarity with the requisites of a good house.

This field has not as yet been traversed in a "general way" with enough thoroughness and simplicity to enable such a one to become acquainted with the elements of good building sufficiently to qualify him to intelligently judge of what he sees. The author gives his readers straightforward statements of facts and practice, avoiding technicalities as far as in the nature of the case is practicable.

A studious reading of these "Hints" would not only help to lessen the perplexity and uncertainty so common among clients, and assist them to an independent opinion, so as to relieve them in some degree of those that are almost forced upon them by men who have been "thirty years in the business," but would at the same time for the same reason assist the architect.

The treatment of the subject is clear and logically itemized, after the order of a specification: each item makes conspicuous those particulars which it is of importance to know. The book is suggestive and not exhaustive, and the amount of information contained seems to be well adjusted to those for whom it is intended. The illustrations are in new styles, which show refinement and elegance and which can be built within the prices named.—*The Builder.*

HINTS ON BUILDING.—By J. H. Carpenter, Architect.

This useful little work (from which we have quoted elsewhere) is not designed as a handbook for the carpenter, builder or architect, but as a guide for those who contemplate building, and who need some judiciously written book, instructing them as to the best methods of doing the detail work which goes to make up a well-constructed and durable building. It is written in an easy and unaffected style, and is worth much more than the price to any one who contemplates building.—*Carpentry and Building.*

HINTS ON BUILDING, is the title of a new work by J. H. Carpenter, a Chicago architect. It is evident that Mr. Carpenter writes more for the popular reader than from a scientific point of view, and his book will be of interest to every one arranging a home, having health in view as well as many other qualities which go to make a house pleasing and desirable. Interior and exterior decoration are treated of, as well as the general parts of building and other matters.—*Herald.*

HINTS ON BUILDING—By J. H. Carpenter, Architect.

"Containing in a nutshell what every one wants to know who contemplates building."—*The Tribune, Chicago.*

HINTS ON BUILDING.

"WHERE TO BUILD."

Here I would pause, to hear you tell me your ideas of the location you have been looking at, or, perhaps, as you have already bought it, you have reasons for believing it to be exactly what you want. These reasons, if they include your necessities, convenience, health, pleasure and profit, prove you have ability to decide without the aid of our suggestions. But to those who have not had experience to assist them, or who are trying to decide these important points, we offer them, hoping they will carefully consider each point in detail.

Necessity is the first requisite in selecting a location, not indeed as the most important one, but one which in itself remains a consideration in determining the value of the property.

A person who labors in the heart of the city, or in a business district during uncertain hours, would be unwise to consign himself to greater inconvenience and expense by selecting a piece of land to live upon which will cause it. To such, a location near his business or near rapid running cars, making timely trips, even at a good round price for the lot, is far the cheapest investment.

But to another person whose business engagements are not so exacting as to time, and whose leisure enables him to seek a location more congenial to his fancy, these considerations are not so important and the same money will buy for him more extended limits to his lot of ground in the suburbs, and to such the pleasure of the garden and surroundings to his home are enjoyments not to be neglected.

Health is given to man that he may enjoy his labor, the rest which follows and the pleasures life has in store for him, and if he carelessly submits himself to a trial of strength

and vitality by locating in a dangerous place, he has himself only to blame, and must suffer the penalties which so surely follow a misstep.

It is important, then, that the person selecting a site should examine thoroughly the nature of the soil, and see that the ways of drainage which are to remove all surface water, waste water, etc., are adequate, and can be easily connected at a sufficient depth to insure good service.

The nature of soil is readily determined by the surface indications, and if these precautions for health cannot be carried out, be assured the property is too dear, even as a gift. It must be remembered also, that a dry soil, though better than a damp one, is often the outlet of gases which travel under ground and will prove worse than a damp location which can be drained. This is hard to detect, but it can be done by close observers, and it is well to have it examined thoroughly.

Pleasure, in a location, depends upon the surroundings, views, convenience and the desirableness of the place, not only for the husband and sons who sleep there at night, but for those who must ever remain on the place as the center of their labors and pleasures.

These pleasures at best are quite limited, and the arrangements of the house for use and comfort, are often more important than the surroundings, but pleasure in the whole is a consideration in selecting a site and building, the memories of a pleasant place once enjoyed being ours through life.

Profit, when made by our investments in property and building, is as much the result to those seeking a home as it is to the speculator. A great many are engaged in this kind of speculating, the majority being those who own only one lot and house while some others may own more; those who are largely interested in speculative building are in the minority In a city like ours and its suburbs, one can hardly select a site having any desirable points which can prove a bad investment, as the growth of the city is so extensive, each year overlapping its former boundaries, the vacant lots one season being filled the next, and as the population still continues to grow the work of building must go on to meet the demands of those who have means to buy and no time to wait for homes

to be built, paying to each owner a handsome profit which enables him to begin another house, and have a balance in cash for future investment.

Many persons in this city who had to borrow to make the first payment on their lot now own large estates and have it to say it was their chance, and lucky it was, too. Some, again, who failed through misfortune in their first attempt tried again, and owe it to their pluck that they succeeded. Others again have not succeeded because of embarrassment following a venture beyond resources, and from not knowing how to retain their grip on their opportunities, but they are few, fortunately, and we trust our hints may be of value in waking their courage to retrieve their losses.

WHAT TO BUILD.

The first principle to be followed in determining what to build is to provide for present necessities, and to begin properly commence by sketching the idea of what you want on paper—no matter how crudely—figuring the sizes of the rooms and at the same time making a list of everything thought necessary for use.

You know your own necessities better than another can tell you. It is a mistake to adapt your wants to some other person's ideas, and if you want a house to suit you try and study out *your plan.* You can assure yourself your memorandums are what you must have, and the following hints will perhaps assist you in determining upon the best points in the details of what is required to make the house a good one for use, save expense for repairs, and regrets for omissions which are afterwards found to be necessities.

To aid in solving this problem we will consider the requisites of a few rooms, leaving the rest to be put in as they suggest themselves. Before adopting ideas, be cautious that unnecessary expense and luxuries which cannot be afforded are not all added to the list of wants. What to build, means economy as well as beauty and ornamentation.

THE HALL.

This is the place where first impressions of a house are received, and if it be pleasant, the sensation of pleasure will

not be forgotten. If otherwise, it will prove cheerless and uninviting.

Halls are of two kinds. The first we describe as a passage-way with entrances to each room, with stairs at one side, and furnished with a hat-rack, a chair, etc. This kind of a hall, though in common use, can be improved by dividing off the stairs from view with a portiere of woolen goods, which will form quite a neat reception room.

The other kind of hall is a large room with the stairs at one side, neatly fitted up, an open fire-place, suggestive of comfort, and such other conveniences as the space will permit. It becomes a family sitting room, in fact; it connects with all the rooms and it has a home-like appearance about it truly inviting.

THE PARLOR.

People who receive much company require a parlor dressed up with its walls, furniture and decoration in keeping with the means of its owners.

Such a room wants broad, open bays, or large windows on the street, and if not too stately in its effects, it will prove enjoyable, and a delightful hour in it is a relief from the cares of the living part just back of it.

THE SITTING ROOM.

This room is necessary with a parlor; it is where the family and more intimate friends all meet together, and the occupations of life can also receive attention.

People whose means or fancy does not admit of a parlor, use the best room as the sitting room with good reason and with broader enjoyments of home life. There is where mother's basket, the children's books, baby's toys, and father's papers, all find appropriate nooks and corners. Here hang the portraits of dearest friends, and it becomes the center of life. Neither parlor nor drawing room so cordially invites relaxation, and it is as welcome in the house of the rich as in those of more moderate means.

A few plants are welcome in a sitting room. It should be well lighted, and, if possible, a fire-place put in to add to its cheerfulness.

THE DINING ROOM.

If the house can afford it, by all means have it a separate room, cheerful and suggestive of good things for sustaining life.

This room, if arranged conveniently, with easy access to butler's pantry, with china closets, dressers, etc., fitted in, is the *mater familias'* paradise. It should be well shut off from the kitchen, and servants should not have access to it except through appropriate passages. It should always have an open fire-place, for use in weather when heaters are not in use, and also in connection with them to add cheerfulness.

A conservatory adjoining would be an abundant source of pleasure, which would attract the mind from things of ordinary life. The furnishing and decoration should be quiet, light and suggestive. Other things can be said, but as more abundant means suggest one's own enjoyment, we will confine our remarks to the homes of the majority.

In the arrangement of rooms it is always best to place a dining room east and west, that it may have the morning and evening light, and be cool, without the glare and heat of the day. In most cases it cannot be set so as to have both, but if either can be obtained, the morning light is preferable.

THE KITCHEN.

It is safe to say that no part of a house occasions so much perplexity, or demands more time and thought. In all the other rooms the wife can exercise her taste and skill, and then rest; but the kitchen presents new problems for each hour, and should be made so as to provide for contingencies, and against accidents which may annoy her and tend toward the spoiling of the dinner and her sweetness of temper.

Our idea is that a kitchen is not usually all it should be, when we consider of what importance it is to the household. Owners should provide more liberal expenditures in this part of the house, which is sure to pay good interest. It is well to commence with the motto, "A place for everything, and everything in its place,"—and provide the places.

A kitchen, to begin with, should be well lighted and well aired by large windows opening on every side possible. The ceiling should not be low, and ventilation should also be se-

cured by way of the chimney, that savory smells may be drawn off and not left to spread through the house.

The range and fire-place should be perfect, and have large hearths in front of them. Shelves over them should be avoided as a catch-all, which collect dust, to some future annoyance, shelves should be provided, but in other appropriate places, and hooks should be in handy places.

Dressers, enclosed with glass doors, fitted with drawers, cutting-boards, suitable shelving, nests of boxes, and flour bins should not be forgotten. Sinks should be large and deep, with drip-trays at side, and separate sinks provided for dish-washing in or near the buttery, all connected with hot and cold water.

Wastes to garbage-boxes should be arranged, admitting of immediate and ready use, that all refuse may be thrown out as it accumulates, and that food will not appear as a garnished exodus from an assortment of peels and rubbish.

The floors should not be cold, and thereby injurious to health, but made double and lined.

The exposed walls should be wainscoted to the height of chair-backs, and decorative dadoes can be formed of oil-cloths of appropriate pattern; the walls should be painted in cool neutral tints.

If the arrangement of rooms does not admit of a separate laundry, then let the tubs be arranged in the kitchen with covers, to form tables. Soapstone or ceramic ware is preferable to wood, for many reasons.

Laundries should, if possible, be a separate arrangement, with hot and cold water appliances, and separate stoves for heating irons, etc., and should be well lighted and airy.

All boxing in of tubs, boilers, and sinks should be avoided as far as possible, and much trouble with vermin will thus be prevented. Also see to it that the plastering extends to floors behind all closets, surbases, etc., and that nooks for vermin be effectually closed up while building.

A cool cellar of easy access to the kitchen is necessary. It must be fitted with hanging shelves and places for everything.

Coal bins cost but little, save coal, and keep it clean.

Ash chutes discharging into an ash barrel save steps.

BEDROOMS.

The location of bedrooms is a very serious matter and a house which must have dark, unventilated, and uncomfortable rooms to sleep in, is useless, unhealthy, and wasteful of life. They should be large enough for the furniture needed, and the comfortable use of the occupant; they should have good ventilation and a supply of air, enough to keep it pure, they should be light, and easy of access. We are aware our idea does not harmonize with the probabilities of cramped quarters in a crowded city, and with the present practice in building tenements, but nevertheless we insist on these conditions as the only true ones, and advise the shaping of the house to suit them, which can be done by a little earnest endeavor.

We might prolong this chapter by mentioning the library, billiard room, and other apartments, but space forbids, and the hints if followed so far will suggest places for them, though they must necessarily add to the cost of the house.

CLOSETS.

Must be placed convenient to every room, of good size, with drawers, shelves, clothes hooks, etc., and, if possible, ventilated. Closets everywhere are conveniences which every lady appreciates, and they help keep the house in order. One of them should be in every passageway for linen, towels, etc., and another made moth-proof for furs, blankets, etc., when folded away.

ECONOMY IN BUILDING.

The aggregate expense of building in proportion to results has usually been so enormous that many persons are discouraged from attempting it.

The large startling items and the possibility of innumerable bills of extras coming afterward show the necessity for deliberate action in getting ready before the job is undertaken.

With some there is a tendency to over-estimate the capacity of money in building, and they build beyond their means. and put in many things which could be dispensed with, having the idea that it is only going to cost *a little more;* and if there

were not so many of those littles, few buildings would exceed the first amount of outlay agreed upon. Others are fearful of greater expense than they intend to incur, and under-estimate their wants, and, seeing the need of many things afterward, also become victims of extras.

None of this is necessary; plans and specifications, fully considered and deliberated upon, are the true basis for economical building.

Deliberation as to time of building is another source of economy. Never build in a hurry, unless circumstances which will cover the additional expense force you. Hundreds of dollars can be saved by taking advantage of circumstances which tend either directly or indirectly to diminish the cost of materials. Ordering goods ahead of time allows manufacturers advantages they are always willing to share with you, and your architect will be of great advantage in assisting and advising you.

In the following descriptions of materials and necessary additions to a good house, we are treating in a general way of buildings costing from one thousand to one hundred thousand dollars; many things referred to, a man of limited means could not afford except in a modified way.

Economy does not lie in the fancied saving of money; and when a man tells you he can put up a cheaper building for you "without so much plans and specifications," or by more modified ones made by himself, make up your mind at once that he can only do it by taking advantage of your inexperience in building, and "skinning" you of many comforts, conveniences, and material actually necessary for the durability of the house.

HOW TO BUILD.

Supposing you have selected a piece of ground, examined its title by careful legal tests, and after determining what to build, made sketches of the rooms and memorandums of necessities and comforts, your first step would be to consult an architect, of whose ability you were satisfied, of whose impartial integrity you were assured, give him your sketches and have him put them together; then, while they are yet in pencil, consult with him as to the carrying out of your wishes.

It is a great mistake to attempt to put up a building with-

out complete plans, specifications, and working drawings, having complete technical and legal descriptions of labor and the materials to be used.

Carefully studied drawings enable the builder to calculate accurately the amount and sizes of material and the labor required, saving all waste.

The *cost* of plans and specifications is comparatively a trifling percentage of their value, and is in proportion always to the amount to be expended in building. In numerous ways several times their cost is saved, and a better structure is secured in design and workmanship.

It is very desirable that owners should allow their architect some liberty in design and cost. We are always more ready to make additional designs to reduce expense than to remodel a costly one. If designs cannot be produced complete at prices to suit according to your ideas, it is better at once to abandon it, and try a design less costly to finish. A good design half completed and without its proper finish is a blemish and easily detected by an artistic eye.

Never attempt to get an estimate of the proposed cost of a building until the plans and specifications are all ready or you will be misled by somebody's guessing. Nearly every one has heard how estimates differ on the plans when they are made, and how much more they must differ when there is only a verbal understanding to guess by.

It is not necessary because a design is elaborated that it should be more expensive, but a reason why it should be less and a surety that value is received for value given.

Make a fair test of the cost of the building by estimates from contractors. If, then, it proves within your means, make your contracts putting the architect in full charge, and consult with him frequently as to the progress of the work. Making changes in the plan with the contractors, except in the presence of the architect, is to destroy his authority to act for you, and gives contractors an opportunity for snubbing you or for adding extras of which you do not understand the nature. Jerry builders by this means get their opportunities, whereas, a good, responsible contractor prefers to see your architect, and arrange matters with you both; and if you have not got confidence in your architect sufficient to enable you to respect his judgment, discharge him at once, and trust only in your-

self, which will make you sure of getting what you want, even if it does cost more.

Before you begin building, see that the proper permits are taken out, and the lot surveyed, grades established, etc.

THE ARCHITECT AND ENGINEER.

In every true architect there are, as it were, two individuals: the *artist*, who by his imaginative genius conceives and combines solids and voids in harmonies of design, his mind grasping in advance of execution all the effects, and detecting in his study all surroundings that will add to or detract from its beauty or utility, thus bringing out the building to its best advantages; and the *constructing engineer*, who must understand all the requisites of proper and substantial construction, from theories established upon his own experience and that of other masters, be personally familiar with strength of materials, their weight and resistance to direct and transverse strains; must arrange them also to accomplish their purpose without waste of substance, and yet in such uniformity with his conceived design as to be a part of it.

Before science subjects him to the rigor of mathematical calculations, his artistic genius rises to conceptions which feeling alone should judge; and as a constructor he makes those conceptions a reality in form and power.

He must be familiar with the technical requisites of all the trades and manufactures connected with building, and be a judge of all work done, from that of the humblest mechanic in the drains to the high art of the esthetic decorator, and the finishers of all that is to add beauty in finish.

He must not only plan, design, and arrange the work in detail, but give it his practical and personal supervision until completed, and draw the minds of all men engaged in the execution of it into harmony with his conceptions that they may assist him in completing them.

The high price of materials and labor has necessitated more thorough study of engineering than was required of architects in past times; then it was sufficient for him simply to design and direct its fulfillment, materials being abundant and labor low-priced. But now the owners are not satisfied,

and should not be, until assured to a mathematical certainty that their works are sufficient in strength and durability.

The charge is sometimes unjustly made against architects of receiving commissions or bribes from builders on account of work done under them. That such is the case in some instances is known, and all architects having the success of their business in view, sincerely regret that it is done, hold it in abhorrence, and stand ready, socially and professionally, to ostracise any architect accepting it, or a builder offering it. The high dignity and honor of their profession is conscientiously maintained by such to their credit, even when sometimes poorly compensated for their labor by the owners.

DESIGN OF BUILDINGS.

The design of a building in many respects represents the character of the projector. It is surprising how the designer intuitively incorporates the ideal of another into the design, and the whole art and study of the architect should be to obtain that very result, and that it prove a source of pleasure to the occupant; keeping in view also the other points which which govern the design:

1st. The legitimate influence of materials must be considered, and based, as a rule, on a knowledge of style and precedents. It is useless to ignore the fact of their influence. We may try to conceal or counterfeit material as we like, the logic of fitness confutes us; the results betray the deceptions.

2d. The relation of purpose and arrangement to design; for a building is faulty which fails to show its use.

3d. The structural conditions, truthfully shown, form a basis for the architect's highest ingenuity. There are pleasing effects in any building which shows its ability to sustain itself to its use. And, as is too often the case, the construction should not be concealed nor false systems of support used just for the sake of giving the appearance of strength. A little crack in the joints is a fatal mark against it, and has the unhappy faculty of appearing much larger than it is.

4th. The relation of ornamentation to construction has greater claims upon us than most designers are willing to give, because it prevents the use of flattering pieces of work which true taste at once prohibits. The only true theory is to orna-

ment construction; after that is done all other ornamentation must be subservient, or it will prove to be a blemish. Overdressing shows a weakness of character; nobility in art should be the highest aim. The ancient temples a lover of classics and art will ponder over and view in awe, observing the grand effects of construction, so simple and so true; and as soon as the eye begins to examine the details of construction it is entranced with the wonders of the ornamentation which seem to open up in every direction,—in no way obtrusive, entirely subservient to the construction; and surely their examples of the true theory of ornamentation are worthy of our following.

To build, to plant, whatever you intend,
To rear the column, or the arch to bend,
To swell the terras, or to sink the grot,
In all, let Nature never be forgot;
But treat the goddess like a modest fair,
Nor overdress, nor leave her wholly bare;
Let not each beauty ev'rywhere be spy'd
Where half the skill is decently to hide.
He gains all points who pleasingly confounds,
Surprises, varies, and conceals the bounds.

CONTRACTS.

Written agreements are proper and necessary, whether the work be contracted at a stipulated price or by day's work. Let no man foolishly suppose, for a moment, that a verbal agreement is of any value as a building contract.

All parts of the work as well as prices should be stipulated, the manner of making payments, insurance clauses, method of arbitration agreed upon, etc., in a legally written paper, setting forth also that all work of addition or alteration shall be in writing and a part of the agreement; that the work shall be in full, fair compliance with the terms of the plans and specifications and subject to the approval of a superintendent, whose authority shall not be a matter of dispute. A proper agreement waives suspicions, settles numerous disputes, and becomes a matter of pleasure between the contracting parties.

The plans, specifications and all details of construction and finish form a part of a building contract, and should be signed by the parties.

Contracts need not be more than memorandums of intentions, and the amounts to be paid as a consideration. But the

statements should be exhaustive of the subject, and no part left with a verbal interpretation.

SURVEYS.

The surveyor should set stakes for each angle of the lot, give the grades at curb and the building line, and the levels at each stake, also furnish a plot of the ground with these points all appropriately marked, contain the depth of sewer and any other information desirable to the owner. A good surveyor will save future annoyance by other owners. Never take any one else's stakes as a guide—own your own and be sure you are right.

PERMITS.

A permit or license to build, alter, repair or improve a building, must first be obtained from the several departments of the city government before any work is commenced, or severe penalties will be imposed and lead to delays and vexation quite unnecessary. The object of the permit is to ensure the improvements contemplated, being examined into by the proper officers appointed by law; preventing errors by well-meaning persons which if permitted would not only injure them, but their neighbors. The ordinances on this subject require that persons desiring to utilize the SPACE UNDER SIDEWALKS, shall obtain a permit from the Commissioner of Buildings, which in itself specifies the details of construction; the owners of the property being required to give to the city a good bond in the sum of $5,000, approved by the City Comptroller, which shall secure the city against any damages from the neglect of the owner or contractors, in keeping the openings safe according to law, and against any and all accidents occurring.

Before the erection, construction or material alteration of any building in the city is made, the owners, architect or builder, must submit to the Commissioner of Buildings full specifications and plans of the proposed work, and also a detailed statement on prepared blanks, which shall give:

1st. The location of the proposed work.

2d. The general dimensions, number and height of stories.

3d. Dimensions of joists and timbers, and the distances apart.

4th. Dimensions of supporting iron work.

5th. For what purpose the building is designed, and the applicant must sign an agreement that he will construct the work in accordance with the plans and specifications, and detailed statement, and in strict compliance with the building ordinance.

The fees for the water tax are as follows: For every 1,000 brick used in building, 5 cents; for every cord rubble stone used in building, 6 cents; for every 1,000 yards of plastering, $1.50.

Permit for obstruction of street (which also includes sidewalk) must be obtained from the Board of Public Works and the fee is one dollar for the first month, and two dollars for each month thereafter, that material or debris remains in the street.

Permit for SHEDS on the rear of lot not over 12 feet high, and not exceeding 256 feet in area, and for privies not over 10 feet square and 12 feet high, built separate, according to section 999, revised ordinances, the fee is 50 cents.

Permit for SHELTER SHEDS as provided for in section 1,000, for each 1,000 cubic feet, the fee is 5 cents.

Permit for each building of brick or stone, not exceeding 25x40 feet in area, and one story in height, the fee is one dollar.

Permits for all structures of masonry, or masonry and other material combined, which exceed that area and more than one story in height, shall pay a fee of 10 cents for each 1,000 cubic feet, including the area of roofs and basements.

Permits for plumbing work and sewer connections, are issued under the severest restrictions to plumbers who are licensed, and pay fees and give bonds to follow the ordinance covering their special work, and permits to connect water, sewers and other service, must in all cases be obtained. All other persons than plumbers are cautioned of heavy fines and penalties to be incurred from meddling with these kinds of work.

REMOVAL OF BUILDINGS.

The success of house-movers in removing old buildings and passing almost insurmountable obstacles, has led them to attempt almost anything in that line which may present itself, and brick blocks are now quite as easily moved as frame build-

ings. We would not advise an owner to attempt it except with an experienced mover, as it is a business that has to be learned, and there are many precautions to take in reference to the general construction, position of chimneys, etc. Many a building which would otherwise have to be torn down can be saved this way and put on inexpensive property.

When moving a building bodily a mason is engaged to make openings in the foundations for *needles* (timbers), clearing the way of obstructing walls, and getting new foundations ready. All material of old buildings taken down should be properly assorted, cleaned, and piled in a suitable place on the premises, ready for use, and all refuse immediately removed.

Permits for the removal of buildings from one property to another must be taken out by a licensed house-mover who is under bonds to the city for all damages done by him, his agents, or employes. This permit he gets from the Commissioner of Public Works, and the fee is five dollars.

Before this permit can be obtained for the removal of a wooden building, the owner must procure and present to the commissioner the written consent of the owners of the majority of the feet front of the same block upon which he proposes to locate, and also of those owning the block opposite, who are within 150 feet of the proposed location.

There is no law hindering a person from moving a house within the range of his own premises.

LIEN LAWS, ETC.

Many articles have been written on this subject, and some of the architects' associations are laboring to effect such legislation as will revise the laws now in vogue, that they may secure honest work and the payment of moneys due material men from dishonest contractors who, secure in their inability to be prosecuted, take contracts at figures far below honest rates, scrimp their work as long as it is tolerated, and if they fail of securing success by creating difficulties and embarrassments between the owners and the architect, which they invariably try to do if the architect presses them too hard, then they will throw up the job and leave the owners to fight it out with the material men. The object of the Jerry builder, as this kind of a man is called, is to obtain payment on the

new contract to keep urgent creditors quiet, and to enable him to negotiate a new bill of materials with the knowledge he has nothing to lose, and if he makes anything it is clear gain. Next to material men sub-contractors are the greatest losers, as they are debarred from securing their rights by lien after forty days, and the plausible excuses of a contractor who has a desire to rob them will cause the time to elapse.

In very few cases does the owner attempt to shirk payment. The lien laws and attachments covering nearly all cases. The lien laws made for the protection of the working class so largely interested in the building interests, are wise, and have prevented much loss by dishonest schemers; but the same laws protecting them have not included penalties upon men who connive to rob the owners and create an almost interminable long list of annoyances.

Owners are safe from paying the contract price more than once if they have not been inveigled into the indiscretion of advancing money on different terms than those of the contract, or if they have not been loose in making the stipulated terms in the contract—that is, they are protected in regard to the claims of material men and sub-contractors after having once paid and complied with the statutes in regard to building. But if the Jerry builder deserts the owner after trying to fleece him, he has no redress but the liability of having to pay double to some one in the extra cost entailed upon him to make good the deficiencies of his whilom contractor who looks serenely on, secure from everything but a tongue lashing, which he does not dread, and who is ready, after that is over, for another victim.

EXCAVATIONS.

Excavations for buildings must always be of sufficient depth to ensure against the action of frost—an average of four feet. Greater depths must be determined by the requirements of basements, cellars, and the nature of the soil to be built upon.

The size of excavation should be one foot wider each way than the actual size of building, to admit of the mason using tools in setting the stone and fitting the joints with mortar, or plastering the face of the walls. After this is leveled off

trenches are to be dug for footings, twice the thickness of the cellar walls, and to the depth of one foot below the cellar bottoms.

If proper soil for building upon is gained, a good ramming with an iron weight will considerably harden the earth and settle it more than a great many tons of stone-work built quietly into place.

Before building, it is necessary to take precaution against uneven bearings, and search out all soft spots of quick-sand, marl, etc. Excavate them and fill them in with a concrete of broken stone. Borings should be made at several places to ascertain the nature of the sub-strata of earth, from four to eight feet in depth, according to the weight of building to go upon it. A strata of this thickness, if it proves good, will hold an ordinary building, even when the strata under is softer.

If the ground prove soft, of a loamy nature, recourse should be had to *cradling*, or a good broad footing of *concrete*. Should it prove watery or very soft, *piling* must be done to secure a firm foundation. Made ground should not be built upon, but excavations made to solid bottom.

It must be remembered that all earth is compressible, the main object being to secure an equal settlement. The settlement continues for some time, but is checked sooner by adopting the precautions referred to.

When excavating, lay aside, for a future top dressing, all the top soil that may be needed, piled up one side, and also throw out and leave on the bank sufficient earth to fill in around walls after they are built; this should be done while building, to prevent the trenches filling with water.

AREAS.

Are used to all entrance ways to basement, and around all windows which extend down into the ground. They are usually built with stone walls extending at least one foot below area bottom, and coped with cut or dressed-stone coping. The bottoms should always be lined, and a hole cut through the flag for the escape of water, and connected with the pipe drains, or a cesspool formed of broken stone under it, that the walls may not be affected, or dampness created in the cellar. Areas for windows can be formed cheaply by set-

ting a four-inch wall with brick in a semi-circular shape in front of it, and backing it up with waste stone and earth.

DRAINAGE.

All persons building should realize the importance of perfect drainage, and while a few persons can live in a poorly drained house despite all its ills, the majority are very sensitive to the effects of bad drainage.

Sanitation requires equal care in other directions, which is considered under proper headings, but as the system of plumbing and modes of exit for water are by a common drain, it becomes us to see that it is the best system obtainable.

Tap the sewers if accessible; if not, provide proper cesspools at a depth sure to secure ample fall of water. Suction created by a rapid exit of water removes possible obstructions and keeps pipes cleaner—the velocity of waste being greater in a pipe nearly full than in a larger one half full. Six-inch pipes usually accomplish all an ordinary house requires, and is the size commonly used, being preferable often to a larger one, as the water has an opportunity frequently to flush it, and gathering scum, which is a source of disease, is removed.

Make all joints tight with cement, and when laying it be sure none are left broken or set astray, and that the pipe is bedded the whole way in mortar to prevent the weight of earth above breaking it. The most careful supervision of this work will relieve the owner of future anxieties. It is particularly noticeable how slight an obstruction will cause particles of waste to remain in the pipes to send back noxious smells, usually attributed to the sewer.

Connections with sewer pipes should be made with the Hermetic Sewer Connections, which will make them perfectly secure and readily repaired if it becomes necessary to disturb them.

Beside this drainage, in all soils showing springs, or possibility of water accumulating, there should be proper wall-drains laid, connected with surface basins filled with broken stone, and connected thence to sewer, if convenient. Several other ways will accomplish like results, which the architect will suggest to suit circumstances.

STONE-WORK.

Stone walls under ground are usually built of good *rubble-work;* that is, of good shaped quarried building stone, roughly squared, bedded, and bonded, laid up in courses a foot high, and *through* stones built in every three feet in each course, all spaces filled in with *spalls* or chips of stone and mortar. All joints of work exposed to view are slushed full of mortar, or pointed, as desired. This kind of wall is strong if well built; if not, most serious results from settlements are likely to occur from action of frost and rains.

A better wall of stone is formed of blocks more carefully squared and regularly bonded, every stone over-lapping, and *through* stones more plentifully used. A wall built this way will prove more than twice as strong as a rubble-wall. All buildings of any weight or size should have foundations laid this way in preference to thicker walls laid the other way, as thick walls are only faced on the outside, and seldom well bonded in the center.

The foundation is at the bottom, it will prove the *root of all evil* if not a good one, and must not be slighted if you would avoid the principal source of unsightly cracks inside and outside of the building.

It is not enough to trundle in a few large stones, scatter a little mortar here and there, and with seeming anxiety get out of the ditch as soon as possible, with little thought of how much depends on the contents of that ditch, and the way the materials are combined for good or for evil.

Footings should be of broken stone, rammed into the trench, and grouted with liquid cement mortar, so that it will set into a solid mass; or of dimension-stone laid cross-wise to the walls and *well bedded* in mortar.

The walls should be of stone, below ground at least, though brick is sometimes used. Where stone walls are used below ground and brick above, it would be well to project the extra thickness of the stone walls out into the bank, so that the inner face is flush; also over the stone-work lay a *damp course,* of tar and sand, spread over the wall to prevent the suction of water from the earth by the brick-work.

If the foundations are of brick they should be commenced in broad footing courses twice the thickness of walls and

racked in to the thickness of the required walls. All brick-work under ground should be laid in all-cement mortar, and plastered a good coat on the outside next to the bank. The thickness must depend upon the super-structure, and be at least four inches thicker above the ground than the upper walls, and eight inches thicker under ground.

The *thickness of stone walls* depends upon the super-structure, and varies from sixteen to twenty-eight inches for ordinary houses—

Foundations for buildings			20	feet	in	height,	not	less	than	16	inches.	
"	"	"	25	"	"	"	"	"	"	20	"	
"	"	"	35	"	"	"	"	"	"	24	"	
"	"	"	55	"	"	"	"	"	"	28	"	

This will make them as a rule eight inches thicker than the upper walls. Walls next to street fronts must be four inches thicker against vibrations of passing loads. Long walls should be braced with buttresses. All other kinds of buildings require special study of the constructing engineer, to determine the thickness and method of construction.

The *strength of stone* is different in dry or wet soils. Sandstone thoroughly wet will sustain only half as much as a dry stone. Stones will crack with half their crushing loads, 100 tons per square foot, so it is not a good practice to load them over twenty tons per square foot.

BRICK-WORK.

Only good, well-burned bricks should be allowed in any brick-work, though it is a common practice to use up the soft brick in the heart of thick walls.

Good brick should have a rich color, and the different shades are assorted to different sides of a house. If good, they will ring with a clear metallic sound when struck together. Bricks that are soft enough to break off at the corners and edges with the fingers, and all swollen brick must be refused.

In dry weather bricks should be wet to prevent absorption of the moisture from the mortar; in cold weather it is not necessary, as the brick is not then so absorbent, and the freezing of the water would injure them irreparably.

Employ good bricklayers, as a poor job is always regretted. A wall should be laid up in courses and bonded every sixth

course with a row of headers. Mortar should be used freely, and all spaces filled in solid, and any walls or piers sustaining great weight should also be grouted full of liquid cement, to ensure solidity.

Form discharging-arches for all openings, and avoid building in timbers to nail wood-work to; if it is necessary, use lath or wood bricks. All projecting courses should be *corbelled* out in heading courses, and not projected for cornices more than the thickness of the wall supporting it, as it is likely to overbalance and fall off. Leave channels for pipes. Brick walls are sometimes built hollow, but just as many brick must be used for strength as though they were solid.

Washing down of brick-work with a solution of *aqua fortis* and water cleans the brick thoroughly, kills the lime-washing, and removes discolorations.

Oiling brick-work is very beneficial, as it develops the color, and creates a film in the pores which helps to preserve a smooth surface.

Painting brick-work is often resorted to where the color of the brick is not good; it does not preserve it, but prevents absorption of water, making houses less subject to dampness. Where paint is to be applied the brick should be rubbed down with a piece of sandstone and cement water, that the pores may be filled up and little incrustations smoothed off.

Fire walls. All outside walls, and party-walls between houses, should be carried up above the roof and coped with stone or terra cotta coping. They are a great protection against fire when an adjoining building is in flames.

Filling in with bricks. We do not advocate the filling in of frame houses with brick, for if the space, four inches, is filled up by laying the brick flat, as usual, making a solid wall, we find the house usually cold and damp in winter and warm in summer. We advise *back-plastering*, as it not only excludes the cold, but admits of enough ventilation to keep the walls dry. The filling in of frame houses with brick one foot high above the sills is an excellent preventive against rats and mice.

Tuck pointing is a sham and a disgrace to any house, and is only used to cover a poor manufacture of brick. The color soon washes out, it peels off, and costs two dollars per thou-

sand extra, which, if added to the first cost of the brick would buy a good quality.

Bracing new walls should never be neglected, for the mortar being green, has no cohesive strength.

The *size of a brick* is usually eight and one-fourth by four by two inches, which is sixty-six cubic inches. In ordering a large number be particular as to size, as one-fourth inch each way less in size will contain only fifty-two cubic inches, thus requiring full twenty per cent. more brick to do the same amount of work, and be more costly in laying, as the same price is usually paid per 1,000. Smaller brick should always be bought for less money, and should not be taken when standard sizes can be had. The cause of difference in size is sometimes from short molds, but oftener from the shrinkage of the clay in burning.

The *weight of bricks* will average four and a half pounds each, and two tons per 1,000, gross weight. A cubic foot of brick weighs one hundred and twenty-four pounds.

The measuring of brick-work depends on the size of mortar-joints used in the work, they varying from eighteen to twenty-three per cubic foot. The average of twenty-two and one-half is used for measurements when not otherwise agreed to. The measurement usually overruns the kiln count of brick used, because of extra allowances for laying which a mason is entitled to by custom in rules of estimating.

Efflorescence or *lime wash* on brick walls is caused by the heavy washing of rains common in this climate, which thoroughly soaks out the magnesia in the lime used. Some believe it is the fault of the brick alone; but this may be reasonably doubted when we see that brick brought from the East, which does not lime-wash there, are covered with it when used here. To cure it, use the best of pure lime, which has very little magnesia. A gallon of linseed oil added to a barrel of putty mortar will check it.

Potter's colored mortar, formed of pure lime mortar and soapstone, makes a putty for facing brick which is hard and impervious to water and will prevent lime wash.

The Anderson Pressed Brick Co. make a pure lime mortar which has prevented their brick from lime washing.

Pressed brick should be used for all facings of walls; they cost more than common brick, but they form a protection from

cold and dampness which is invaluable, besides adding beauty, which is more than compensated for in the selling price of the house.

Molded brick add much to the decoration of a building, and can be used to form jambs, arches, panels, string-courses, cornices, piers, etc., in endless variety and at a moderate cost.

Colored brick are becoming popular, and an improved manufacture of variegated, paneled, colored and enameled bricks, adds another list of useful material for embellishing our buildings.

MORTAR.

Lime mortar is readily affected by moisture in damp situations, absorbing it from the ground, and also from the air, in situations not dried out by sunlight or air; and it is a common thing for it to remain soft without setting for several feet up from the ground. In such cases cement must be added. Moisture also affects cement, but with a tendency to harden it.

Sand used in mortar must be of sharp crystals, to give the best surfaces for cohesion of lime or cement, and must be free from clay, which prevents adhesion, and from salt, which draws dampness, causing the walls always to drip and be moist.

Mortar made too rich with lime will also be too slow in setting, the strength of mortar depending on the perfect mixing of the ingredients.

Frozen mortar is ruined if once thawed out, and walls put up in freezing weather should be of mortar well mixed with cement, to cause the proper set before it can possibly thaw. Walls thawed out and improperly set must be taken down and rebuilt, as they are liable to fall down and cause much damage.

Lime to be of use must be fresh and protected from the weather until used. Lime well slaked requires time in order to properly dissolve the grain, and the longer time it has the better.

The proportion of one measure of lime to five measures of sharp sand is commonly used for light work, but where the walls are made thicker and require greater strength the pro-

portions of lime are increased to one part to four and one part to three, these proportions of lime used depending upon its quality and the richness of the mortar required. Brick dust added to mortar renders it hydraulic.

Cement mortar is mixed in proportions of one measure of cement to three of sand for light work, and one measure of cement to two of sand for heavy work.

The addition of one-third part cement to two-thirds lime makes good mortar for brick-work put up in variable weather, or in exposed situations, and in proportion of half and half will be as rich as need be for most emergencies. It is also best for all stonework under ground subject to much moisture or superincumbent weight.

Concrete is formed of broken stone, even in size, and large gravel, all well-laid and rammed down solid, and a grouting of liquid cement poured into it and set in a solid mass. For cellar bottoms it varies from four to six inches in thickness, and is afterwards floated smooth with a good coat of cement mortar. If used for foundations the width of trench is always at least twice the thickness of wall, and more, as circumstances require, and laid in courses not exceeding eight inches, grouted in each course.

TERRA COTTA,

literally meaning "cooked clay," would seem from its name to be very easy of manufacture, yet to produce a strong, durable material it requires a scientific knowledge of clays, and their nature, flint, sand, and other alumina, and successful vitrification requires more than ordinary experience, on account of the variable sizes of the blocks. A simple test of its texture is made with a penknife, which should not penetrate its surface, and will sometimes strike fire on it. It is stronger in tensile strength and under pressure than stone, if properly made, and stronger than ordinary brick. The true qualities of terra cotta in its application to architecture consist in its merits as a decorative fire-proof material, possessing the three essentials of color, durability, and economy; and when treated with due regard to construction, so as to fulfill its part in the building, it admits of the impress of original art and fineness of execution, pleasing in effects in the hands of the architect. In combination with stone and brick fine effects are gained.

To form it in single designs would be more costly than cutting in stone, and its cheapness depends upon the reproduction of the same design as many times as it can consistently be repeated in the same structure. But although it has these numerous good qualities it must be very judiciously used to prevent the appearance of gaudy cheapness.

It can be used in projecting courses, panels, dadoes, spandrils, and in other ornamentation; but it should not aim at imitating those features of stone architecture which require large blocks, for the nature of its treatment should be consistent with that to which it belongs—brick architecture—and in its colors should not be made to affect the appearance of stone, for the sham is at once detected; but if it is used according to the uses of its class of material, honestly executed, without the aid of concealed supports and ties, it will excite respect and honor for the designer.

We recommend that it be used with simplicity in the most unostentatious and straightforward manner as an economical building material, and ornamentation, if added, be massed and composed so as to show a certain idea in its distribution among plain spaces, to give effect of contrast.

CUT-STONE WORK.

The commonest necessities in a brick house are cut-stone sills, lintels, and water-table. To these are added cut-stone string-courses, architraves, paneled dadoes, angle quoins, etc., cut to represent purposes of construction, sometimes plain and sometimes richly carved in style and finish to suit the taste of the designer.

All *stone trimmings* which project from the walls, such as sills, water-table and string-courses, should be cut with a *wash*, or bevel top, and with a *drip* on the under side, or *throated*, as commonly called, to prevent the water from running back on walls and making streaks at the corners of the stone, as often noticed on the fronts of buildings.

Sills should always be cut with *lugs*, which are level beds at each end on top of the stone for brick jambs to start from. It is very common to see an ugly joint of mortar here and there, or a sliver of brick inserted, which is done to save the trivial cost of five cents per foot.

Lintels are beams of stone over openings, to support superstructures, and should always be relieved from accidental cracking by discharging-arches in the walls.

Ashlar is laid up either in courses or broken work, and backed with brick.

In *coursed work* the stone is all of an even height and in a variety of lengths; the joints are set close and pointed in mortar, or channeled, according to the style of finish.

Broken work is square or zig-zag. The square is of promiscuous sizes and set close joint; the zig-zag is of irregular shape and angles, and each stone is fitted to its place and the joints raised and pointed in mortar. The face of ashlar is finished in various ways.

Pitch face is formed, after jointing the stone, by a chisel applied to the sides, which spalls the stone off the face to the appearance of natural rock, showing no tool-marks.

Picked face is the same finish, but picked with a *point* tool to show the tool-marks.

Point-drove face is further finished by a point tool driven across the face in parallel lines, horizontally or diagonally.

These varieties of ashlar are usually finished at the corners and around openings with a *chisel draft*, to give a sharp, finished angle.

Chisel face is the cutting of a smooth face, showing marks of chisel.

Hammered face is the cutting of a face with a *bush hammer*.

Rubbed work is done with a weighted stone, sand, and water, with which the cut-stone is ground smooth.

In more expensive work paneling, decorating, and vermiculating (which represents worm-eaten wood) is done in appropriate combinations.

Other work which is not in common use is also well understood by the architect, and has appropriate uses which hardly need mention here; but all owners should notice particularly that stone-work is cut so as to lay on its natural bed—with the edge to the weather. It is very common to put the bed to the weather to show the marking of the grain, and to save the extra expense of cutting; but the frost of a few seasons causes it to flake off and destroys it, unless the stone be of extra close, hard grain.

STRENGTH OF WALLS.

All Walls for Business Buildings must be of the thickness designated in the following table :

INCLOSING WALLS.	BASEMENT.	FIRST STORY.	SECOND STORY.	THIRD STORY.	FOURTH STORY.	FIFTH STORY.	SIXTH STORY.	SEVENTH STORY.
	In.	In.	In.	In.	In.	In.	In.	In.
One story high	12	8	...	...	...	...	...	...
Two stories high	16	12	12	...	...	..	..	...
Three stories high	16	16	12	12	...	...	...	...
Four stories high	20	20	16	16	12	..	...	...
Five stories high	24	20	20	16	16	16	...	...
Six stories high	24	20	20	20	16	16	16	...
Seven stories high	24	20	20	20	20	16	16	16
Four stories, less than 100 feet	20	16	16	12	12	...	...	...
Five stories, less than 100 feet	24	20	16	16	16	12	...	...
Six stories, less than 100 feet	24	20	20	16	16	16	12	...
Seven stories, less than 100 feet	24	20	20	20	16	16	16	12
DIVISION WALLS IN BUSINESS BUILDINGS.								
For three-story buildings	16	12	12	12	...	...	...	...
For four-story buildings	20	16	16	12	12	...	...	...
For five-story buildings	24	20	20	16	16	16	...	...
For six-story buildings	24	20	20	20	16	16	16	...
For seven-story buildings	24	20	20	20	20	16	16	16
For five stories, less than 100 feet	20	20	16	16	16	12	...	...
For six stories, less than 100 feet	24	20	20	16	16	16	12	...
For seven stories, less than 100 feet	24	20	20	20	16	16	16	12
FRONT AND REAR WALLS.								
Of four-story buildings	20	16	16	12	12	...	...	...
Of five-story buildings	20	20	16	16	12	12	...	...
Of six-story buildings	24	20	20	16	16	12	12	...
Of seven-story buildings	24	20	20	20	16	16	12	12
PARTITION WALLS IN BUSINESSS BUILDINGS.								
For one story	12	8	...	...	...	...	...	...
For two stories	16	12	12	...	...	...	...	...
For three stories	16	12	12	12	...	...	...	...
For four stories	20	16	16	12	12	...	...	...
For five stories	20	20	16	16	12	12	...	...
For six stories	24	20	20	16	16	12	12	...
For seven stories	24	20	20	20	16	16	12	12

ALL WALLS FOR DWELLING HOUSES

Must be of the thickness designated in the following table:

Walls of Dwellings.	Basement.	First Story.	Second Story.	Third Story.	Fourth Story.
	In.	In.	In.	In.	In.
Basement and two stories	12	8	8	...	...
Basement and three stories	16	12	12	8	...
Division walls, basement and two stories	12	8	8	...	...
More than three stories	16	16	12	12	12
Division walls, basement and three stories	12	12	8	8	...
Division walls, basement and four stories	16	12	12	12	12
When first story, or Basement and first story, for Shops or Stores.					
Two stories and basement	12	12	8	...	...
Three stories and basement	16	12	12	8	...
Four stories and basement	20	16	12	12	12
Three story building, division wall	12	12	12	8	...
Four story, division wall	16	16	12	12	12

The height of stories for all given thicknesses of walls must not exceed eleven feet in the clear for basement, eighteen feet in the clear for first story, fifteen feet in the clear for second story, thirteen feet in the clear for third story, twelve feet in the clear for fourth story, and fourteen feet in the clear average height of upper story. If any story exceeds these heights respectively, the wall of such story and of all the stories below the same shall be increased four inches in thickness additional to thicknesses already mentioned.

CHIMNEYS.

There are a great many things connected with the position, formation, and finish of chimneys, usually neglected or done without proper judgment, and greater care must be exercised to prevent the numerous difficulties built in with them, and to prevent the frequent fires emanating therefrom.

The chimney should always be placed with reference to doors and windows, where there is draught, or an opportunity for creating one. A fire-place in the same wall with an entrance door should be avoided, as the halls will, on account of their

greater height, draw off all the heat from the room. They should not be built on the outside walls, as the draft of the flues are checked by the outside temperature, and the windows too often become the means of escape of all the warmed air.

Flues should be as straight as possible, and if there must be a bend let it be near the throat, the ingenuity of inventors being taxed to remedy thoughtless work in malformations. The height of the chimney should be sufficient to ensure a free play of the wind over it, without obstructions, and also of the influence of roof formations which create back draughts. Plastering of flues is of no use, as the action of soot soon destroys its hold and it drops off; a smooth-struck joint is better. Flues starting from the cellar should be furnished with soot boxes in bottom.

All flues carried up through rooms without fire-places should have sheet-iron *thimbles* and tin covers for stove-pipes. Flues should have a man-hole in the attic which helps to draw off the hot air under the roofs in summer, and also as a means for clearing a chimney of obstructions. A great improvement in forming flues is to line them with glazed earthen-ware pipe, as an extra precaution against fire and to ensure a better draught. Flues for furnaces should be lined with fire-brick at least two feet in height at entrance of pipe.

The topping out of chimneys should be done with projecting courses to lap over roof, the capping courses set in cement mortar, and the tops of projecting courses sloped off. Stone cappings are always an improvement in durability and finish.

Fire-places should be well backed and throated, and also connected by an ash flue to a pit in the cellar.

They should not be between windows if it can be avoided.

They aid in ventilating a room, and add to its cheerfulness.

Hearths must be provided for, whether of stone, brick or tile, with hearth arches underneath, corbelled out from chimneys.

Fire-place fittings. Material, such as brick, mortar, and plaster of Paris, should always be specified to be provided for mantel and grate setters, in cases where the owners reserve the right of furnishing the mantels.

Open fire-places should be as wide as possible, depth is a disadvantage which prevents the warming of the room each side of the fire-places.

IRON WORK.

Iron has furnished the building trades with great varieties of means for overcoming the emergencies incident to a strong structure, lightening the massive walls, and sustaining immense weights where little room could be afforded for bulky foundations. The knowledge of its strength in various forms and cross-sections is yet imperfect, and the rapid change in expansion and contraction in our variable climate presents difficulties which must be provided for where it is exposed.

Its use should be guided by experience, and every piece made sure of for its purpose by a practical test under pressure of at least three times the possible weight, noting the deflections and elasticity by the use of carefully adjusted instruments.

Under compression cast-iron gives results over wrought-iron of two to one, while in tension wrought-iron reverses the rule. Combinations of the two are often used in proportion to cover these differences, or either is used and extra allowances made in quantity to cover possibilities of the existing strains.

Hollow shafts, either in compression or tension, are stronger than solid ones of the same area of metal.

A square column has one-fifth greater bearing surface than a round one of the same diameter.

The strength of a column to provide against possible contingencies is put at ten to one of its crushing strength. Columns with the ends planed off true and set with bed-plates will bear ten times as much as one simply squared or chiselled into place. A column out of plumb will only bear one-third as much as one set true.

Columns formed of segments of rolled iron answer for common work as well as cast-iron. Cast-iron columns are sixteen times stronger than wood of the same area.

Girders are made of cast-iron or wrought-iron, with web and flanges to provide for transverse strains, and should always be tested before use. Rolled-iron beams, with flanges top and bottom, and coupled together with bolts and separators, form excellent girders.

Girders having the weight distributed over their entire length will bear twice as much as those with the weight at

center. Those concentrating their weight at third distances will bear only two-thirds, and persons using them should be careful when ordering to make mention of the fact as to the position of piers resting upon them.

Over all girders used the brick-work should commence with a discharging-arch, three courses of rowlocks, and of the full thickness of the wall. Girders have flanges top and bottom because it strengthens them in proportion to their depth.

Beams of rolled-iron make most excellent systems of construction in combination for the support of floors, and in places where a wooden girder would appear as a blemish.

Care must be taken, in examining iron goods, to search for defects often carefully cemented in with iron cement and painted over; also to note that the body of the metal is of the same thickness as the ends, as it is frequently thinner than it shows. A pair of calipers will determine the probabilities and a hammer will detect flaws.

To provide against fire all columns should be doubled and the inner column made sufficient for the weight, so that if the outer shell is destroyed the building may yet be saved. A coating of plaster ot Paris and wood ashes makes an excellent protection against fire for all iron-work.

Iron anchors, for securing beams into brick-work of houses, should be three-eighths by one and one-half inch iron, with six inches turned up into walls and one inch turned down into the beam one foot from the wall and nailed with two wrought nails one-fourth inch thick, one anchor to be used to every fourth beam and to all trimmers resting on the walls. Where these beams overlap girders or a brick wall, use strap-irons, with an inch turned down into the beam at each end.

Bridle-irons and stirrups should be used for timbers framed together, that the weight may not be entirely on the tenons.

Angle-irons should be used in all exposed corners of brick and stone houses, built into the walls and extending well back into the masonry.

Tie-rods should be used freely where small piers are put up, to prevent lateral settling.

Anchor-bolts should be used to secure the roof-plates to brick walls on all buildings having pitch roofs.

FRAME BUILDINGS.

All kinds of wooden buildings are prohibited within the city limits, but the suburbs have adopted pretty styles, at once attractive, cheap and durable.

All framing should fit snugly, and when raising, the too handy use of a chisel should be avoided.

A snug tenon, well pinned, is of important value. It is our practice to set all joist, studding and rafters at a uniform distance of sixteen inches, so that beams and studding lay side by side, and then spike them firmly to each other. Notching out, or mortices, should never be more than one-third the depth of the timber.

Bracing should be very thorough and notched into principal timbers. Studding should be doubled arour[illegible] all door and window openings.

Timber used in construction is subject to crushing, tensile and transverse strains; therefore its shape as well as size has a marked influence in regulating its adaptability. The strength of timber varies materially with the age of the tree, the locality of growth, whether the piece is from the center or outer portion of the tree, the straightness of grain, knots, number of rings, etc. From the time it is tapped as a green tree until erected in place it is subject to influences which either add to or detract from its value; should a stick in use be placed with the natural top of the tree downward, it will show it by rotting at the end placed downward sooner than if placed in position as grown in nature, the laws of structure increasing evaporation and keeping a stick dry which is properly placed, but obstructing evaporation when reversed.

When subjected to crushing strains, a piece on end will bear ten times as much as it will if laid on its side.

The most durable structure is obtained from combinations of construction, and where certain strength must be obtained those principles must be put in force to ensure the work being satisfactory.

The mode of covering most in use is narrow strips, called clapboards, made in a variety of patterns, plain, beveled,

rebated, and put on horizontally. Always use rebated boards of whatever style to over-lap an inch, as they fit to the frame more snugly. Another method is to use tongued and grooved pine flooring with the outer shoulder beveled, or rebated to form a channel joint. The narrower the boarding or clap-boarding, the less shrinkage. Vertical boarding is sometimes used and the joints battened.

Clapboards above described are from one-half to seven-eighths of an inch in thickness; the thicker kinds may be used on cheap houses without under-sheathing, but the thin ones do not keep out the cold winds without it. Special care must be taken to get them perfectly well seasoned as serious defects are sure to occur.

Under-sheathing may be of any cheap, sound boards, planed to an even thickness and well nailed to studding. Tonguing and grooving is an improvement, but adds to the cost. Over this sheathing is usually placed a sized paper felting which effectually excludes all cold air, and thus makes a saving in fuel.

When putting on clapboards it is usual to butt them, making neat, tight joints against all corner boards and casings; but a better plan is to under-rebate the casings, etc., an inch to receive them.

JOINER-WORK.

Good joiner-work is a source of pleasure and profitable to both the owner and the contractor.

A practical worker on principles has the pleasure of knowing beforehand what his work will do, while a bungler is constantly making amends for errors—to his loss; sometimes he is right by chance, but because a house stands it is no guarantee of its durability, for the numerous accounts of so-called accidents show that when tested they failed of their purpose.

The designs of the casings and moldings should be such as to avoid mitres.

Rods for portiers should be a part of the casings if the finish will permit it.

Grilles for windows and doors, or other spaces, should be well finished that they cannot hold dust too readily and to look clean when dusted.

Hard woods are commonly used and much better for the

finish of the best rooms, and cost about double the price of pine when finished.

Yellow pine makes a good rich inside finish; is not as costly as other woods; is rich in color and grain.

Picture rails are ornamental—convenient and always ready for the pictures.

Chair rails are good for dining rooms and save the walls.

Angle beads of wood turned and finished with tips are necessary on all projecting corners.

FLOOR JOIST.

When framing a tier of beams, provision must be made for *trimmers*,—extra-size pieces to support the tail beams, stopping at the stair-wells and chimneys. These trimmers should be of sufficient strength to carry the whole weight of the floors between them, and calculated for the same as girders, and be twice or three times as heavy as the floor-beams. Mortising these for the headers is not a good practice, *stirrups* should be made of iron, and the headers hung into them. Beams directly under partitions, and running parallel with them, should be doubled. No beams should be placed nearer than eight inches to any flue. It is false economy to use light floor-beams, as their constant vibration when walked upon is excessively annoying and unpleasant.

The cutting into beams for gas or water-pipes should never be more than two feet away from the ends, and in depth not more than absolutely necessary for the size of the pipe. The reckless cutting by pipe-fitters seriously injures many a good building, and should it be thoughtlessly done, boards should be well nailed on the sides of the beams cut to preserve the strength.

Beams should never rest upon inside partitions, but be carried through the whole width of the building to the outer frame or brick wall, or, in wide buildings, to girders, provided especially for them to rest upon.

Beams should never be placed side by side to form solid floors, as the wood swells and we have seen buildings burst by the experiment.

Cross bridging should be thoroughly done at least once in a twelve-foot span, and twice in any span from above fifteen feet.

PARTITIONS.

All partitions should be commenced directly from the brick foundation-walls or girders, and not from the top of the joist. On each story a plate should be placed, and the partitions of the next upper story built directly upon this plate.

If not directly over each other then they must of necessity start from the top of the beams. It is poor economy to try to save a strip of studding by building directly upon the flooring, as often carelessly done. Partitions with none directly under them should be braced, to form a truss, over the span; and all principal partitions with others resting on them should be cross-bridged thoroughly. Partitions should be made as a part of the whole construction of the building, and conduce to its strength.

FLOORS.

All floors are much improved by being laid double; that is, with a rough flooring of common boards planed to an even thickness and used until all plastering, etc., is finished, then over this lay a flooring of tongued and grooved boards of the wood determined upon, either pine, spruce, or hard woods. All floorings should be well kiln-dried before laying. They vary from two to six inches in width, and the narrower widths shrink less and wear longer. Each board should be well cramped into place, and no two heading joints to come together, and be well secret-nailed to each beam.

Double floors make a house warmer and more quiet.

Secret boxes in the floors of closets cost but little, and are good places to hide things from sneak thieves, as they are easily kept covered with articles.

The kitchen, the pantry and bath room floors should be of hardwood, and be made warm by double floors and paper linings.

Dining rooms and halls should have floors of parquetry in pretty design; they wear longer than ordinary floors, save carpets, dust, and are easily cleaned. When borders only are used, they let the rugs in even with the top and save tripping. The cost is from twenty-five to thirty-five cents a square foot.

If the floors are of hard woods, give them a coat of good

patent filler, and two coats of heavy coach varnish; this may be pumiced down to any fineness of finish, and will bear waxing, and not dry out when the sunlight happens to touch it. If they are to be painted, all cracks should be filled in with putty. A good mineral paint will wear the best.

DEAFENING OF FLOORS.

A layer of paper felting between the flooring adds to the warmth of a building, and also deafens the floors. It is also the practice to put in rough boards between joist, and rough-gauge mortar in the spaces as a deafening. Deafening should be done when it can be afforded, as it prevents the ceilings underneath being stained, prevents rapid spread of fire, deadens all sounds, and adds to comfort of home.

ROOFS.

This part of the building is put up to suit the forms of the plan, and with such additional features as the designs suggest which will add to the appearance of the building. Much more attention than is usual should be given to it, and it is poor policy to economize in its construction.

It is always best to anchor the plates to the walls, if a brick house, and use a few strap-irons if a wooden one; also bridle-irons at angles of plates and hips.

Valley rafters should always be increased in strength, and if the upper roof is decked, good stout posts or braces should be used, forming a line of support from the nearest partition walls.

If roofs are flat they should be framed like floor joist, and the pitch should never be less than one-half inch to the foot for the fall of the water.

After the framing is all done the sheathing is to be put on and well nailed. We prefer grooved and tongued sheathing, planed to an even thickness, and a layer of felting over it, as it excludes wind and snow if the covering be slate, and deadens the sound if the covering be of tin.

Back plastering, with a rough coat of mortar, adds largely to comfort and warmth of house.

It is good to put a piece of two inch plank on the top of the front walls of a flat roof for the galvanized iron cornice and crestings to secure to.

SLATING.

Slate should be preferred to shingles on a pitch roof, as it is more durable, fire-proof, and has a neater appearance. The value of the house is also increased more in proportion than the difference in cost, and insurance premiums are less.

Provide for and put on proper *tin flashings* around all chimneys, dormers, scuttles, sky-lights, on all hips, and in all valleys, run well up under the slate, and nailed. All flashings should be of XX tin, and painted both sides before using, and all exposed joints and nail heads soldered. Besides flashing, the two first courses of slate up from the gutters and in from valleys and hips, and around all chimneys, etc., should be well cemented. Sometimes a layer of mortar is spread over the whole roof, which is advisable and adds to durability. All slate should be laid with two inches *over-lap* on small slates, and three on large; that is, the surface laid to weather should be half the length, less the lap, which allows the next course to break joint over it, and to extend three inches above the joint, as a provision against the drift of snow, etc. This makes the slate lay double and the laps triple.

All joints must be made over the center line of width, and each slate nailed with two galvanized nails, wrought nails to be preferred.

Slate comes of different sizes, and should be straight, of good, even color, not too thin, and about sixty to the foot in thickness. The sizes best for use are 7x14, making 374 in a square of 100 feet; 9x16, 246 in a square of 100 feet; 11x20, 154 in square of 100 feet; average weight, three pounds per square foot.

The pitch of a slate roof should not be less than one foot rise to two feet in run.

The best slate shows a metallic glistening surface, and rings well. The dead color is indicative of softer material, and it fades sooner, splits more with frost, and becomes weatherworn.

SHINGLES.

Shingle roofs are flashed in the same manner as for slate, and the rule for laying is one-third of length to weather and two inches over-lap. Shingles should be sized as nearly as

possible, so as to break joints at least two inches over the one under; and shingles less than four inches wide, used over the center of very broad ones.

The sizes are generally from eighteen to twenty-seven inches long, four to seven inches wide, and one-fourth of an inch thick at the thin end, and five-eighths of an inch at the butt.

White cedar shingles are the best to use and the most durable. Cypress about half as good, and pine still less. Split shingles out-wear sawn shingles two to one.

Eighteen-inch shingles lay 130 square feet to the 1,000, larger shingles laying more in proportion. Shingles wear from six to twelve years. Two good coats of linseed oil will preserve them a long while, and painting them helps, the same as any other wood-work. Shingles are usually laid on lath two and one-half inches wide and one inch thick, set eight and one-half inches apart.

TINNING.

Tin roofing, to be good, must be put on with care, well turned up and over all angles, and flashed around all openings. As it is subject to expansion and contraction, leaks are always the result if proper allowances are not made. This is provided against by a raised standing joint, which costs a little more but pays better by lasting longer; a flat joint is cheaper but not durable.

Tin should always be painted on the under side of the sheets before using, as the sweating from condensation of vapor causes it to rust readily.

Tin roofs should be painted thoroughly every two years and in angles every fall.

Tin sheets are 20x28 inches in size and of different thicknesses, sized by X, XX, and XXX. X is best for general use as the metal is thin, pliable, and less liable to crack under strain of contraction than thicker metal; anything thinner rusts through too easily. It is known amongst makers and dealers by different brands which designate the quantity of tin actually used. Tin is bright, and of a silvery color adheres in large smooth flakes. Compositions of lead and tin, or zinc, are a dead, smoky color, and last but a shor

time under the corrosive influences of salt air, smoke, and acids, these being the principal causes of its decay.

While speaking of tin, let us remind owners to see to all flashings, as before mentioned, and to window-cappings of frame houses, connections of piazzas, bays, porches, etc., that tin is freely used to prevent future difficulties, and leaks which are a mystery to many people.

COMPOSITION ROOFS,

if properly made, are just as costly as tin. They are made with four ply of paper with asphaltum between, and also well spread over with tar, pulverized slate, sand or gravel, to give them a hard surface, and the whole recoated. Caution must be used by all to investigate the work of those putting them on, to get a good job. The principal advantage is in the saving of painting and easy way of repair. A leaking roof is quite as annoying as a fire—very few know how to make a good composition roof—and no one should be employed who is careless, inexperienced, or whose reputation is not well established.

All brick fire walls around chimneys, sky-lights and scuttles should be mopped to prevent soakage from snow.

All kinds of roof coverings need far more attention by owners than they are willing to give, and it is not surprising that they soon cause trouble when not attended to. They are subjected to all changes of weather, strains of wind, internal influences, the atmosphere and the elements of smoke, besides the numerous acids thrown out by factories which fall on them in showers. If you want a comfortable time in the interior look out for your roofs.

LATHING.

All wooden partitions, ceilings, and brick walls, if firred off, are covered with laths of pine or spruce, split or sawed. They are about one and one-half inches wide, one-fourth inch thick, and four feet long, and set not less than one-fourth of an inch apart. They must be put on in broken rows, called *snatching*. They come in bundles of one hundred each, and one thousand will cover sixty-five square feet of surface, or about seven yards, allowing for waste.

PLASTERING.

The plastering of the inside walls of a building, whether done on laths, bricks, or stone, generally consists of thin separate coats of mortar, the first a *scratch*, (or rough coat scratched with pointed laths to give a clinch to the next coat,) made up of one measure lime, four measures sand, and one-third measure of cattle or horse hair; goats' hair is sometimes used, as it is longer. Wood fibre is often used, and is claimed to be quite as good. Care should be taken to cool the lime thoroughly before mixing in the hair, and hair if rotten is useless. The hair is used to prevent the mortar from coming off in patches when shrinking. When this coat is set, but not too dry, a second *brown coat* is applied; if too dry, it should be dampened a little. The brown coat is of the same rough mortar or coarse stuff, and is used when a good thick coat of plastering is required, and the walls can be made more true and plumb if this coat is applied. The brown coat should always be used on all ceilings, as the lathing does not show through so readily, and as it makes a better finish, even if this second coat is not used on the side walls.

The *third coat* contains no hair, and for giving it a white appearance more lime is used—perhaps one part lime to two of sand, the purest white sand being used. This is called *stucco*, a name also applied to mortar used on the outside of buildings. A stucco wall is best for painting in oil.

Instead of stucco, the third coat may be of *hard finish*, or *gauge stuff*, which consists of one measure of plaster of Paris to two of quicklime, without sand; but it is the practice of plasterers also to add some white sand, and it is called a *bastard* or *half-finish*, or a *sand coat* just in proportion to the quantity of sand used, plaster of Paris being simply used to harden it.

Either of these coats is smoothed or polished to a greater or less extent, according to taste, whether it is to show, be papered, or painted, etc. The polishing is done with a hand trowel, or a float (which is a kind of wooden trowel), and the water brush. The more the work is gone over with the trowel and brush, called floating, and the brush wet with water, the harder it will be, and the higher the polish.

The preparation of white mortar for plastering is an im-

portant item, if good work is desired. The paste of lime should be slaked and cooled at least one or two months before using, and thoroughly sifted through a very fine sieve, for if little pin-heads of lime unslaked get into the plastering they will eventually burst and cause little *pops*, and look pitted, as if with the small-pox.

Soap stone finish is a preparation of pure lime, plaster of Paris and ground soap stone, all ready to be tempered with water and applied as the finishing coat. It is a pretty grey color, trowels very hard, does not chip or crack, and can be washed with soap and water, which is a great consideration in our cities where the walls smut so easily from soft coal smoke. It paints readily and needs no sizing.

Two-coat work is resorted to by many to save expense in labor of one coat, and the first coat is made thicker. Even if care is taken, it does not gain so good a clinch on the lathing as three-coat work, for the scratch coat is put on for that express purpose, and the finish is the white coat, as usual.

Brick walls intended to be plastered, should have the mortar joints left rough for the plastering to adhere to, or if smooth, they must be raked out to give a clinch, and washed down to free it from dust, and dampened, or the plastering will not stick.

Always see that the plastering is carried down to the floor, and by this means avoid as far as possible any space back of the face-board for vermin to gather. Also plaster behind panel-backs, wainscotting, under windows, and where the sub-sill rests on the stone sill, to prevent the cold air and snow from drifting in.

If care is taken to close up all spaces and crevices so as to render the rooms tight, vermin can be effectually kept out and the rooms made warmer in winter.

Plaster cornices are run in a muffled mold, with a mixture of plaster of Paris and lime putty. Plaster cornices will crack if poor plaster is mixed with good, as the common sets the most quickly. It is a common practice to mix glue with plaster when the quality is uncertain, as it causes the whole to set slower.

Plaster centers should be in proportion to the room, not too large nor obtrusive in style.

STAIRS.

Stairs to be properly constructed should have their rise and tread in proportion to the natural walking step, otherwise they will be tiresome and annoying to the person using them.

The width of tread is determined upon according to the space left for stairs, and varies from nine to twelve inches, the width for a dwelling; the rise of step should be about seven inches. Stairs should have ample room for run and not be cramped for head-room, it being very unpleasant to feel forced to duck the head under the upper floor.

Stairs which are constructed with landings for rest are preferable to long continuous runs, and all differences in height of story in different parts should be provided for between these landings, and not in passage-ways, as is often done.

In constructing stairs they are put upon timber carriages. The side pieces, called strings, are of good sound lumber, and cut out to receive the treads and risers (called housing), and these are cut flaring to admit of wedges being inserted and glued in. Each step should also be blocked in the angle on the under side with pieces of wood glued in to make it solid and prevent creaking. The finish is executed to suit the character of the rest of the interior.

While referring to open stairs it is necessary to describe boxed stairways which are housed in between walls. They should always be provided with rails to prevent accidents. Sometimes room is scant to make regularly proportioned steps, but it is best always to plan for good, roomy stairs, as they save broken limbs and painful accidents.

Attic stairs are usually enclosed and a doorway placed at the bottom, so that the heat of the rooms may not escape to the roof.

Avoid winders, except when absolutely necessary to economize space, as they are always dangerous.

Back stairs should always be provided if possible, as they give privacy, save the carpets and make it unnecessary to carry the main stairs up above the second story, unless preferred.

Newel-posts are more or less elaborate, and are best made of pieces glued up and solidly joined and dowelled together.

Rails and balusters are molded, and their finish is subject to the will of the designer.

SANITATION AND PLUMBING.

We have now reached a subject of vital importance, which affects the health, comfort, and pocket of the owner *either for better or for worse.* The plan of the house should be arranged so as to give the best accommodations for all arrangements from the kitchen to the bath-room, and also to secure the arrangement of piping in the interior walls. There are numerous considerations which must affect the arrangement of plumbing, both for effective service and in sanitation, which are imperative, and unless carefully looked after and conscientiously performed, health in mind and body is seriously affected.

Owners are usually struck with a peculiar streak of economy when plumbing is to be done, which is so decidedly against their best interests that we must caution them that no investment in a house pays better interest on money expended than wise and judicious plumbing.

All materials used in plumbing are expensive, but not more so than other goods, when the labor of manufacture is considered. The quality of materials must always be the best, the manufactures from reliable firms, and the plumber engaged an experienced and competent workman, worthy of high wages if he will do his work properly.

Plumbing to be properly put in must commence with supplies of sufficient capacity to ensure service. Hot and cold water pipes not put side by side, as is sometimes done to prevent freezing, but the cold water pipes properly covered and protected from freezing, and arrangements for emptying them when freezing is feared. They should not be bricked or plastered tight in walls, but boxed in, with covers that can be easily removed. Hot water pipes should be provided with circulators, so that delays and waste are not caused by waiting for hot water to arrive.

Soil and waste-pipes must be carefully trapped with approved traps, and connected by ventilating pipes up through the building, and out of the roof. Provision must be made to prevent siphonage of traps, and all wastes caulked tight, and

properly connected with sewer. Arrangements must also be made to prevent choking by grease, washings of ashes, etc., which many persons persist in sending through wastes.

All suites of rooms should be provided with good bath-rooms, complete and attractive. It is so common to put them off in some out-of-the-way corner that it is often a puzzle to find them. As usually constructed they are a nuisance, and distance lends enchantment. But that they should be so constructed is all wrong; convenience is the first consideration: plenty of sunlight, air, and ventilating appliances the next.

Complex plumbing apparatus is not necessary, nor special patented conveniences, in order to secure comfort.

A bath-room should not connect with a bed-room but open into a passage way. It should always have a window or a sky-light to admit air and sunlight.

The usual bath-room contains a good sized tub, wash-bowl and water-closet. These should be the best of their kind. Pan closets are not safe from odors.

All fixtures and pipes should have lead safes, and these should empty in a lead box under the water-closet, in which all the traps are placed, that they may be opened into it, thoroughly washed out, and in case of leakage all the escaping water will be provided for and run into the waste pipes.

Ventilating pipes should never be run into smoke flues, as sometimes recommended, but may be carried up beside a flue if convenient.

WINDOWS.

Windows should have strong frames, made in the best manner, with casings and boxes for weights if for a frame house; hanging stiles and back linings if for a brick house.

The general proportion of windows vary in height from twice to three times their width, and other windows of all proportions, from the dungeon light to the lanterne, used with discrimination, give air and light in darkened recesses, and are left plain or decorated as the taste in the style adopted seems to warrant.

Pulley stiles are best made of southern pine, fitted with pulleys of sufficient sizes.

Sash should be of good thickness, made and fitted to

prevent rattling, and balanced with true weights, hung on steel or copper chains, thereby insuring against vexatious accidents for a generation. Sash are hung in other ways and without weights, but the inconvenience overbalances the little difference in cost.

Windows slightly recessed, and clustered in groups, add an inviting charm to rooms, and suggest enjoyable nooks which make homes more attractive.

Casement sash are used in large extended windows or for opening on balconies, and special appliances for rendering them tight against rain and snow-drift must be used with them.

Transom windows give added grace, and afford means of ventilation. They can be elegantly filled with stained or Mosaic glass in ornamental designs.

Windows give more light if placed in the center of the front of the room than when placed near the corner.

Bay windows always add beauty to the room.

The *lower window sash* should have only one light of glass. The upper one may be divided to suit the fancy.

Double glazed sash keep out a great amount of cold; prevent the effects of the sun on carpets and the frosting of the glass in winter.

Cellar windows should all have double sash.

Inside blinds are an important feature in every modern house, and too much care cannot be exercised in selecting that style or system of blind that combines the greatest efficiency with the neatest appearance. Sliding blinds are very properly fast superseding the folding blinds that have so long annoyed housewives. There are many worthless appliances in the field, but only one seems to be worthy of commendation. That has rolling slats that can be placed in all panels if desired, and has wood upon the springs which support it for contact with the guide instead of naked metal.

If folding blinds are used they should always be folded into side boxes. As it costs more to do this they are usually hung to the casings and tear the curtains, etc.

DOORS.

It is a common practice to set the jambs for doors for the plasterers to finish to. This is an injury to the jamb in many

ways. It is subjected to wetting by the mortar and gets sprung all out of shape by it, and also by the settlement of the building to its place by the accumulating weights. It is the proper thing to put up rough grounds for the plasterers to work to. Jambs should then be perfectly squared and set plumb. Doors should be of the best material and qualities; a poor door is a bad investment at any price. They should be well fitted and hung on loose joint butts, so that they can be readily taken off, to ease the fitting when necessity requires; it is also convenient to remove them when opening the whole house for company. It is always well for an owner to look for and remedy the cause before cutting a door.

Doors vary in thickness and proportion to the height of stories, also with the use; the height is usually two-thirds the height of the room and the width two-fifths of the height. All doors opening into large rooms and between rooms should be double-faced; the rest may be single-faced—that is, finished or molded on one or both sides. Doors should all have molded saddles of hard wood under them, and turned door-stops with rubber heads to protect the walls. When carpets are run through door-ways saddles may be left out.

The placing of doors should be well considered. Those opening into adjoining rooms should be as nearly opposite as possible.

Doors opening into a room should be hung so that the light will fall directly upon the person entering, that he may be distinguished quickly. They should also open against the fire-places, so as to prevent a suction of heat from the fire-places up the hallways.

Doors opening into chambers should be placed so as to conceal the bed from view of persons in the halls, securing all the privacy possible.

Doors which are liable to clash should be hung with their backs near together, when they are not so liable to strike.

PAINTING.

The principal material used in house-painting is either white lead or oxide of zinc, ground in raw (unboiled) linseed oil, in proportion of three or four pints to each ten pounds.

Good painting in lead requires four or five coats, but

usually three is given, leaving the additional coats to a future period. Each coat must be allowed to dry perfectly before applying the next, and put on quite thin if durable work is desired. One pound of keg paint will cover about two square yards the first coat, three square yards the second coat, and four for the third and other coats.

When, as is usual, raw oils are used for thinning, *dryers* of sugar of lead, sulphate of zinc, or litharge are used, about a heaping teaspoonful to ten pounds of paint. Japan varnish is sometimes added, but is not good, as it causes the paint to crack all over, or *craze*. No dryer is necessary if painters' boiled oil is used for thinning—not that boiled oil dries quicker, but painters' oil comes already prepared with litharge.

Raw oil is clearer in color, lighter, and makes a good surface to paint on. Boiled oils are preferred for interior work.

Turpentine is also used for thinning paint, and makes it flow very freely, but as it destroys the gloss of oil it is called *flatting*. Little or no turpentine should be used in work to be exposed to the weather, and on inside work only when a *dead finish* is wanted, or haste in finish is required. While turpentine is not a dryer, it evaporates quickly, and facilitates hardening.

White lead paint is adulterated extensively with whiting, and if adulterated it should not be used, if good work is required. White lead, while it is the most used, is also the most perishable paint we have in use, and discolors easily.

Zinc white is used in colors of light shades when transparency of color is an object, but is not as durable as white lead. Sometimes painters mix them.

Ready made paints, in all the popular shades, are now prepared extensively. A few manufacturers conscientiously furnish good goods, but adulterations are common in the majority, and soap is used largely as a mixture with oil or concentrated lye, which cuts up the material sufficiently to let it be spread easily.

Mineral paints, with chemical combinations, are in common use under various names, and are cheaper, very serviceable, and stand weather very well, but should be well tested before use.

Colors are *mineral*, *vegetable*, or *metallic;* that is, are oxides of metals, etc., more or less durable, and are ground in oil for house-painting, ready for mixing.

Creosote stains are now used extensively in covering shingles and the surfaces of frame buildings.

All surfaces to be painted should be well smoothed with fine sandpaper, all dust removed, and perfectly dry. Nail heads should be punched one-eighth of an inch below surface, and puttied up on second coat; not on the first, as the wood absorbs the oil, and the putty will not stick. *Knots* should be covered with a couple of coats of shellac, dissolved in alcohol, and then smoothed off with sandpaper. No turpentine should be used in the first coat, as the wood absorbs it quickly and leaves the paint on the surface without cohesion.

The best paints for preserving iron are made of pulverized oxides of iron. Painting unseasoned wood hastens its decay.

FILLING AND VARNISHING.

When it is desirable to retain the surface and effects of natural woods, they are smoothed perfectly and a coat of filling applied, which fills up the pores of the wood, enhances the beauty of the natural marking of grain, and presents a very smooth finish for varnish. Filling, if colored a little, heightens the effect, and gives an appearance of age often desired. It is sometimes colored to produce imitations of darker woods.

Varnish should be of good quality, and well applied. It can be worked so as to give a *dead* or *glossy* finish, just as desired.

Wood-work prepared for filling and varnishing should be secured in place by secret nailing as much as possible, and by brads prepared for the purpose; when necessary to use putty, it should be colored to match the wood. Sound knots in wood-work are sometimes desirable for effect of finish.

Ebonizing and *color-marking* are usually done with fine colors ground in japan; they dry a dead color, and the bright effect is given by the varnish.

INTERIOR DECORATION

is gradually gaining popularity, and examples of taste and

refinement are now to be found in the houses of those in moderate circumstances as well as in those of the wealthy.

The methods of the uneducated decorators are now being replaced with studied designs, which show elegance in taste and adaptation to their uses and situation.

Judicious decoration in oil painting, distemper, fresco, water-glass, etc., all have their place, but should not be brought too prominently forward in place of the more elegant achievements in relief decoration now becoming more extensively used and within the reach of even quite limited purses. The genius of invention has provided resources, besides the hand processes of carving, which, used in combination, produce those happy results of which the owners of ancestral halls are so justly proud.

Nothing less than stern necessity should compel an architect to forego in interiors the infinitely various and charming effects produced by light glancing on raised, rounded, and re-entering surfaces in addition to the ordinary methods of pleasing the eye by colors and lines.

It is usual for owners to plan the building without regard to future decorations, trusting to happy circumstances to suggest the style and finish, after all the wood-work, etc., is in place; but it would be far better to have the designs of the interior made at the beginning, that the wood-work may be gotten ready for future additions, and harmonized with them. Every house should be rendered artistic and harmonious in its decoration and furnishing.

If the art work of our homes is treated as a separate thing and left to chance conceptions, it will be all false, having no realistic life, and quite likely to result in a mongrel worthy of being consigned to oblivion with the conceited so-called esthetes.

The selection of goods should be in true taste and color, and to suit, and not because they are an exact copy of some one else's. If not found in stock in the market, direct appeal to a manufacturer should be made and followed up until the goods are supplied, it being well to remember manufacturers are glad of opportunities to suit inquirers, without adding additional cost to the production over the price of other goods of the same quality. Let the inquirer also be consistent, make careful preparation of designs, and then maintain them, even

against pretty things, which are apt to be only a temptation to be afterwards regretted.

So many cheaper goods are now in market ready for use which will give fine effects, that we advise all parties to give decoration serious consideration, and when it is possible to obtain them, to do so.

Hard wood work grilles, columns, brackets, panelings, of ornamental designs, are in common use, and support draperies in various ways, which do much in adding to the beauty of rooms. Mantels and over mantels with mirrors and brass work are now made in unlimited variety, and are very appropriate.

VENTILATION AND WARMING.

Thanks to a few persevering sanitarians, attention has been aroused to the attendant evils of poor ventilation. Some people feel quite assured that all ventilating methods are failures, while we find in experience that they all have some points of value, but the use of them is so little understood that they become useless.

Ventilation implies use of proper warming apparatus, and fuel, and to *use* it with discrimination is the true source of economy, not its *disuse*. Writers often elaborate on all the distinct proportions of good and bad air, but with the majority it is of no moment.

We feel as though we could not too strongly urge upon those preparing plans for new buildings, the vital importance of full and ample provisions for ventilation and warming. Proper flues for heating, and foul-air pipes are a necessity, even in cellar-walls, so it is proper to provide for them in planning, for they cannot be provided for afterwards without great cost and trouble.

It does seem as though it was time we had learned to build our houses to enjoy them after spending so much upon them. and we should have in just as pure air as can be obtained out of doors. Costly appliances are not necessary, but *motion of air* is necessary, that true comfort may be attainable.

Arrangements for ventilation cost but little, when provided for. Open grates for ventilation are good, and their woful waste of heat and fuel is an item every one notices; but as better health is a consequence, it is wise to continue them

where you can have nothing better. Our essay, however, is to those about building, and to them we can earnestly say: Provide liberally for ventilation and warming: study up the subject and apply its principles, and if it doesn't work it is because it is out of order somewhere.

An illy ventilated room is colder than one well ventilated, as it is the nature of foul air to neutralize the effect of heat on the body, and when one suffers from cold extremities in a warm room it is the sure sign of imperfect ventilation.

We caution owners from a hasty selection of heating apparatus recommended only by unknown manufacturers, but to be wise and prove a furnace before it is ordered. Cheap furnaces with very thin castings and sheet iron connections, last but one season only, and repair bills soon pay the price of a good one.

These remarks may seem to be intended only for expensive houses for wealthy people. While they are indeed addressed to them as well as to those in moderate circumstances, still ventilating appliances are readily adjusted to the cheapest house ever built, and the expense is only in proportion to the cost of the house, and small at that.

Set furnaces are enclosed usually in a room formed of brick, with doors set in for coal, ash-pans, air-boxes and a man-hole; the top covered with sheet-iron or other fire resisting contrivances to protect the joist or other wood work. Portable furnaces are those enclosed in a galvanized iron jacket. It is always well to set them down in a pit, bricked around and the bottom grouted solid in cement mortar.

The *pipes* should all be well formed, set in place and hung with stout wire fastenings to iron hooks: and where they approach nearer than a foot to the wood-work the joist should be flashed with tin. All pipes should have dampers in them down near the furnace, to prevent the heat accumulating in pipes not in use. Those extending up through partitions to upper stories should be double, and the space not less than one-half inch all around.

Wire lathing should be used for the plaster to render to. Where single pipes are used, all the studding and ends of joists on partitions near them should be flashed with tin, but even then they are unsafe.

Whenever possible it is best to use the chimneys for carrying the pipes.

Hot air registers are in variety, for the floor or side walls. Those with soapstone borders and double boxes are the best for floors, and extra boxes of tin should be placed around the registers in side walls, all set in plaster of Paris.

Registers should never come behind doors, nor be situated so that they must be stepped on when walking into the room.

FIRE-PROOF BUILDINGS.

Buildings indestructible by fire have never yet been built, as all material is influenced by heat to its destruction, but that we may add preventives and obstacles to its progress is possible and necessary in all kinds of buildings; even frame houses can be made comparatively fire-proof against the usual causes of fire, and neglect of proper precautions against draughts of air in buildings of iron, stone, or brick will render their destruction sure from very trivial causes.

The first preventive of fire is to effectually close up all systems of air-chambers in walls, floors and roofs, and check all possible continuations of draft from the lower part upward and through the roof. This may be considered by some to mean also a checking of ventilation, but it is not so, for ventilation, to be proper, should be regulated by flues of its own, constructed for that purpose. Plaster is a most effectual stopper to close up the openings referred to, though sometimes a few bricks will be needed to help fill in the openings to the spaces.

Heating pipes should be put so as to clear all wood-work, and as before recommended, put in double and plastered between, and timbers flashed with sheets of tin. Wood-work is also easily protected by a coat of plaster mixed with ashes.

Hearths should not be set on wood bottoms, but on brick arches, and in sand.

Outside brick walls and party-walls should all be extended above the roof at least one foot, and coped with curt-stone to prevent flames from adjoining buildings affecting the roofs. It is also necessary to see that all outside cornices, cappings, and appendages are not simply traps inviting sparks to set them on fire.

When constructing a building it is poor policy to neglect these few common precautions for the sake of their slight cost. The full amount of insurance cannot pay for valuables, whether costly or not, and the long illness from colds and nervous prostration of the inmates is an item of magnitude for which money cannot pay. So it should be with us a considered necessity that all parts of a building are finished with the best precautions possible against fire, and as even our best efforts may not be sufficient against it, means of escape are of equal importance. Inside stairways and means of egress are better than exterior ones, and devices of all kinds for putting out fires should be familiar household appendages.

ELECTRIC BELLS, ETC.

The cost of electric bells is so little, and the instruments so much better than the old pull and jingle systems, that they should have the preference. Besides the door bells, a system of calls through the house will save steps and prove convenient.

Speaking tubes, if added, will prove a blessing that will be appreciated.

Burglar alarms are easily added to the simplest system, and make a house secure from intrusion, better than bolts or bars.

Flash lights for gas lighting are being rapidly added to the list of conveniences in dwellings, the opening of a door or the pressure of a button lighting the gas.

INSURANCE.

All buildings, as soon as there is any construction put up, should be insured, not only by the owner to protect his rights in case of loss, but also by the contractor, each separately, as the insurance company does not ensure the rights of two parties in the same policy. The owner, by this prudence, makes sure of the return to him of payments made on account of the contracts and does not suffer loss by the financial failure of the contractor, which is sometimes caused by the fire, leaving the owner to retrieve himself as best he can while the insurance by the contractor will enable him to pay off his obligations for material and labor and to resume his work without serious loss.

Persons insuring should include in their policy the fences and other yard fixtures; also the store fixtures, gas fixtures, plate glass doors and windows when the plates are of dimensions of three feet or more, ornamental, cut and stained glass, as these are not generally mentioned in them and no indemnity is allowed unless they are mentioned.

Losses by explosions are not paid unless fire ensues, and then the fire loss only is settled for. The assured, in the event of a fire, must invariably do his best to save the property and carelessness in this respect will vitiate his claim. In no instance shall he abandon his house to firemen or thieves, and he must also give the alarm at once, without waiting for the fire to gain headway, if he would clear himself of the suspicion of intent to defraud.

It is commonly supposed that if a contractor insures his interest in a building which is mortgaged to the full amount and is afterward destroyed by fire that the contractor's claim ceases; but the Supreme Court of the United States have decided the question in favor of the builder, who, having an insurable claim at the time the policy was issued, is entitled to receive the insurance money in preference to the mortgage.

STORES AND STORE BUILDINGS.

This class of buildings is seldom regarded by the inexpert as anything but an easy one to handle. A store is a large show room, but its proportions, the position of windows and doors, columns, etc., are a matter of great moment when the goods must be displayed to the best advantage and the ingress and exit of the people is considered. Light is another consideration of the highest moment, and to build a store all the points which assist in the make-up are vital features to those who must thrive or lose on their commercial ventures.

The illustrations inserted are suggestive of pretty exterior views, and may be utilized in a variety of ways to suit the amount of display desired. Windows, as a rule, should be large and deep enough to admit the dressing of forms, etc.; the doors should recess, to admit of shelter in case of rain while the customers fold umbrellas.

The variety of expedients for making dressy, elegant fronts is very large.

CHURCH-BUILDINGS.

This class of buildings is one which requires the most particular and studious kind of work and the designer of churches must not only be the practical and efficient constructor of large buildings with their heavy walls, strong floors and large spans of roofs, but he must be one who is imbued with all the love of practice in high art and realize his work to be representative of the connection between that which is of the terrestrial and the work of the Divine author of all worship carried on within its walls.

Churches should be ideal and impress on the mind of its occupants the solemnity of their worship,and again the lightness which overcomes all somberness of thought, which is oppressive, and lifts the joyous thoughts to that of praise.

Simplicity of character in design is a beauty in itself, which should predominate, and be the rule of construction, as best showing the massiveness consistent with the idea of almighty power, while the symbolism of the early Christian church, which harmonizes with the readings of the promises and works of God in his church, should be the only expression of ornament. Conveniences for worship and other services in a church should be proportionately provided for and made a part of the whole, that the idea of its oneness of purpose is apparent at all times.

Lecture and school rooms, while used for their specific purpose, should never be less than a repetition of the same ideals, but perhaps in a modified sense to suit the amount expended on them.

Acoustics is a quality possessed by few churches, and it can only be obtained in the first planning and conception of purpose of the whole design, as this property is not the result of anything to be added afterwards, but a result obtained by the form of the building, the proportions and systems of ventilation.

The *ventilation* and *warming* of churches where the economy of apparatus and of operating is esteemed, the method of warming is by hot air furnaces or steam, and the ventilation is by such precarious methods as to be at all times uncertain, and which are at best a kind of semi-ventilation, while the method of ventilation should be conducive to the

proper distribution of heat and the apparatus used should produce the air at an equalized temperature of not over seventy degrees, sweet and pure.

A method of heating which robs the air of all vitality and moisture by burning it out, is to be discarded as unhealthy, while a system which warms the air to the proper temperature, and supplies it rapidly is healthy, and can in nowise cause the disagreeable down draughts of cold air in unlooked for quarters, and particularly around the pulpit, where it injures the speaker, who is too often warmed up to extreme heat and as suddenly cooled off by a draught which is penetrating and uncomfortable in the extreme.

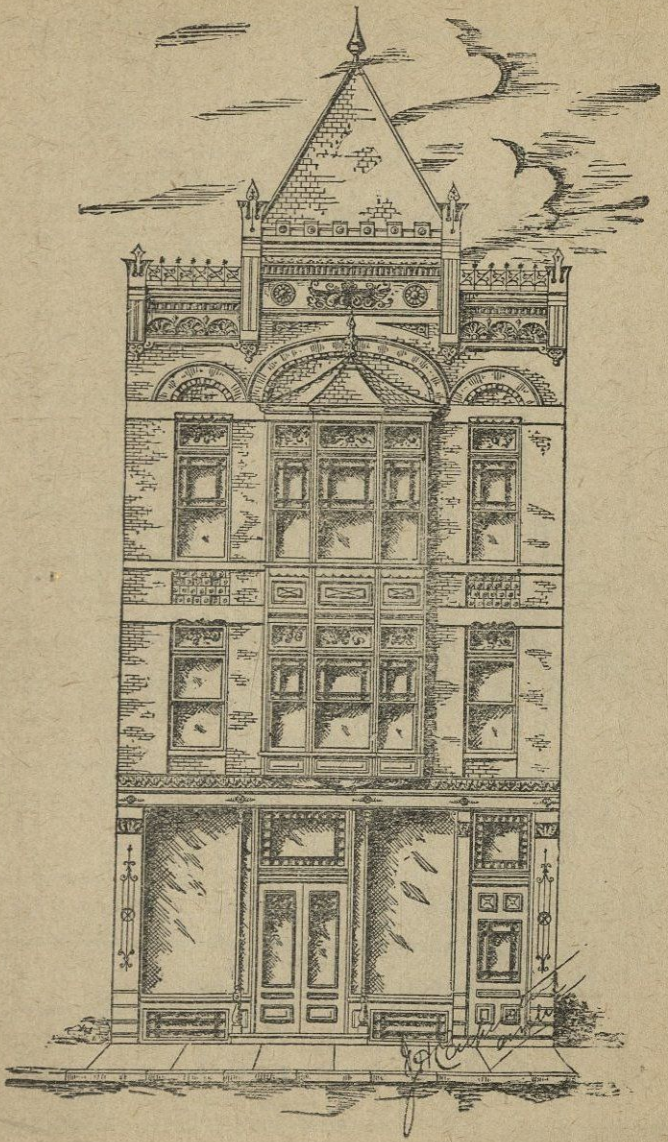
The *form* of church buildings is quite varied, that of the cruciform shape with its high nave and side transepts being the form of churches used from the earliest Christian ages, until modified during the times of the commonwealth in England, and since then any form which could be enclosed by four walls was good enough until the present scientific research has proved the cruciform shape and the amphitheatre form to be equally sufficient for good acoustic properties, and for the comfortable seating of the audience.

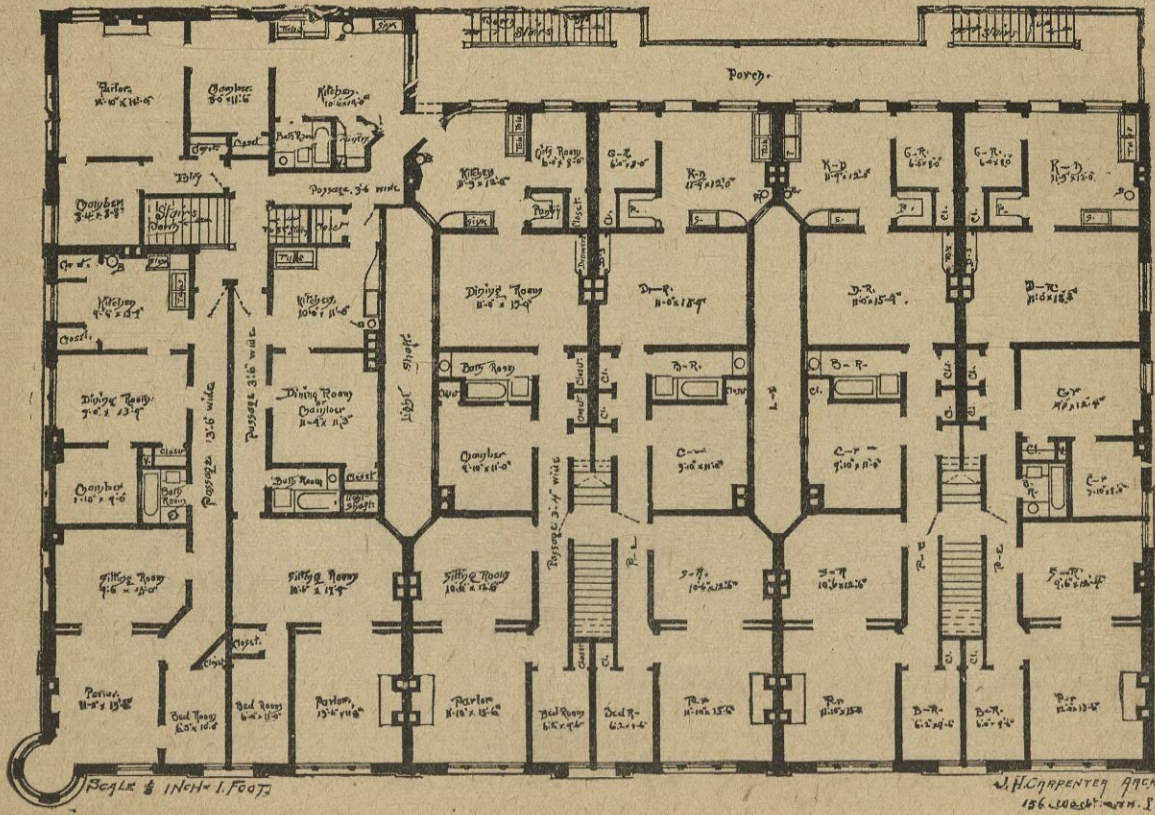
The Roman Catholics and the Episcopalians still adhere to the cruciform shape, and while that style has been adopted by some of the other denominations, the majority of them have adopted the Grecian amphitheatre form, which has relieved them from the variety of a mixed style and gives them characteristic features in design at once pleasing and popular. But space forbids writing fully and intelligently on this subject in these pages, and our reverend clergy are cordially invited to communicate with us, and we will be happy to meet any questions at issue and assist their efforts by practica l suggestions which we have gained by special study and experience in ecclesiastical architecture.

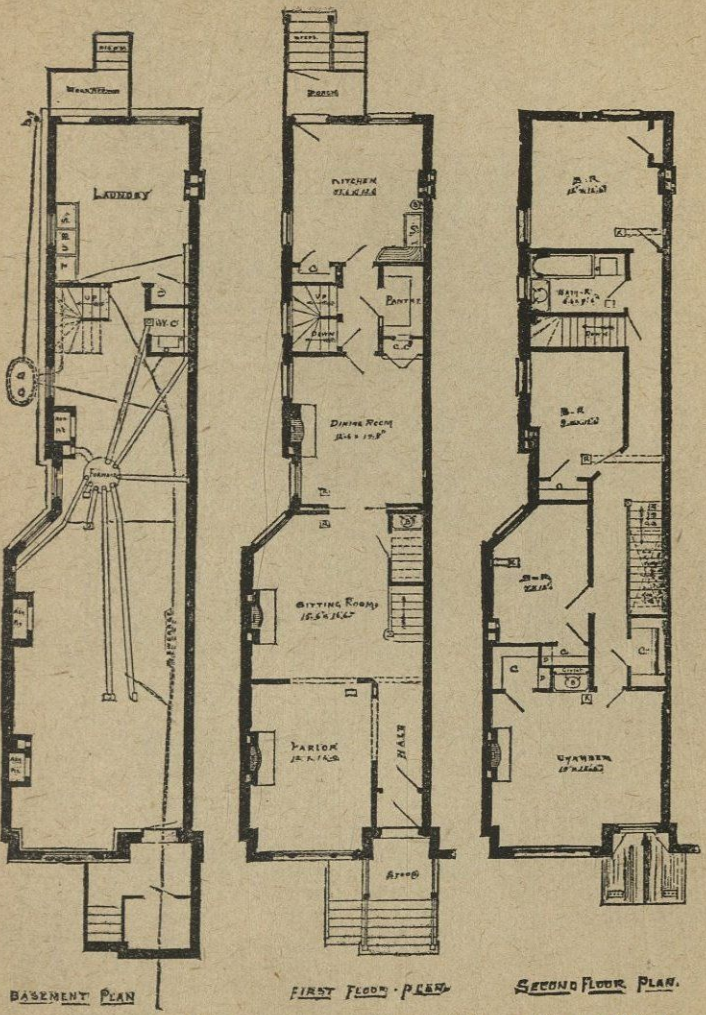
STAINED GLASS.

Stained, cut, bevelled and molded glass are now necessary in all classes of buildings.

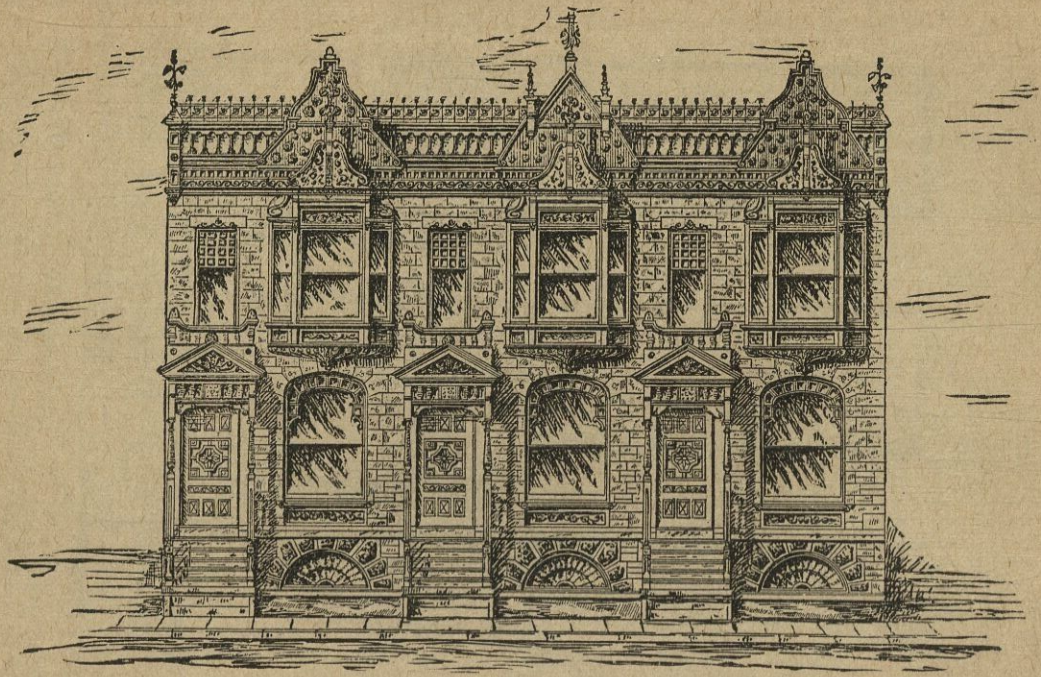
The pyrographic process and sand-blast have added new attractions which may be used alone or in combination. opening new fields of design unexcelled for beauty or utility.



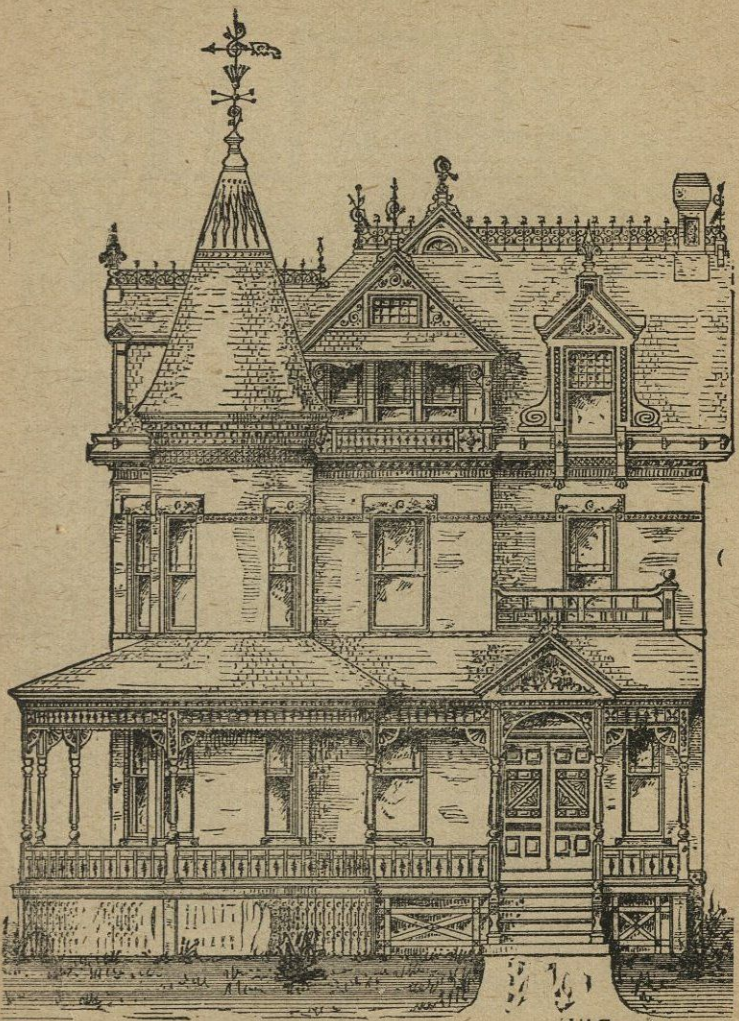

Porch.
Passage 3'6 wide
Passage 3'6 wide
Passage 3'6 wide
Light Shaft
Dining Room
Sitting Room
Sitting Room
Sitting Room
Parlor
Parlor
Parlor
Bed Room
Bed Room
Bed Room



These plans are for narrow houses—three on 50 feet or four on 75 feet. The arrnagement is popular, and the houses cost $3,500 and upward.

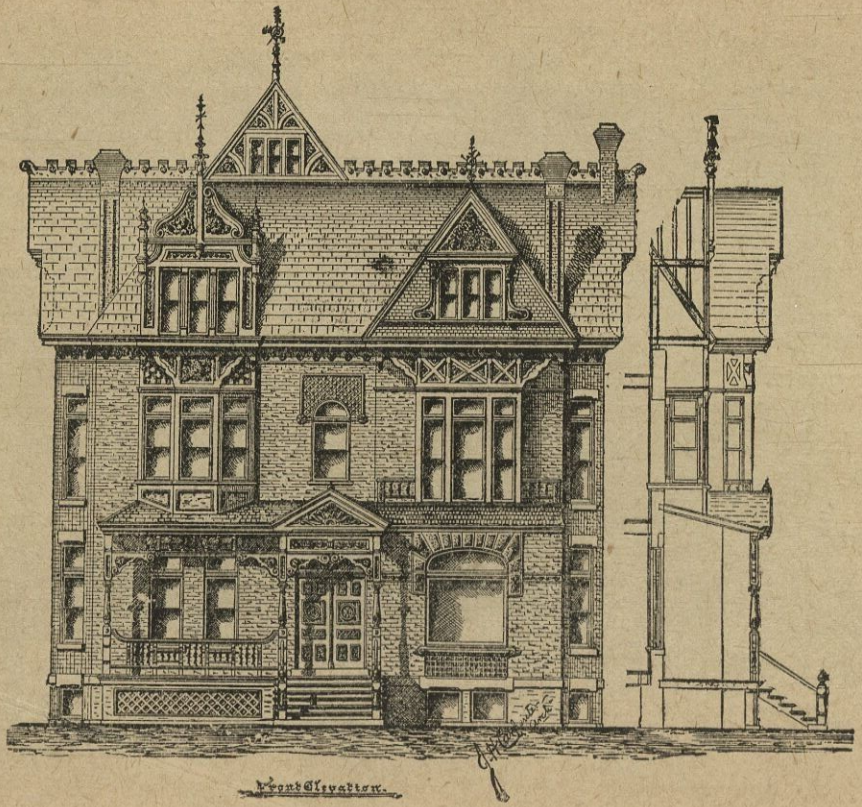


DESIGN FOR THREE HOUSES ON 50 FEET.

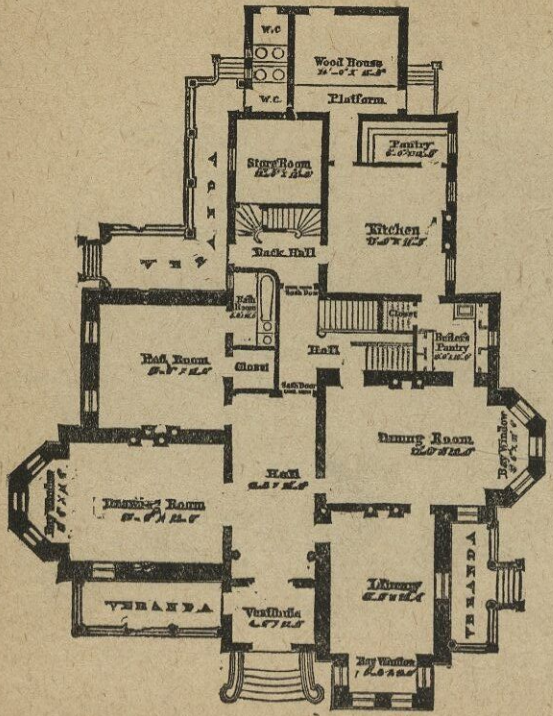


FRONT ELEVATION.

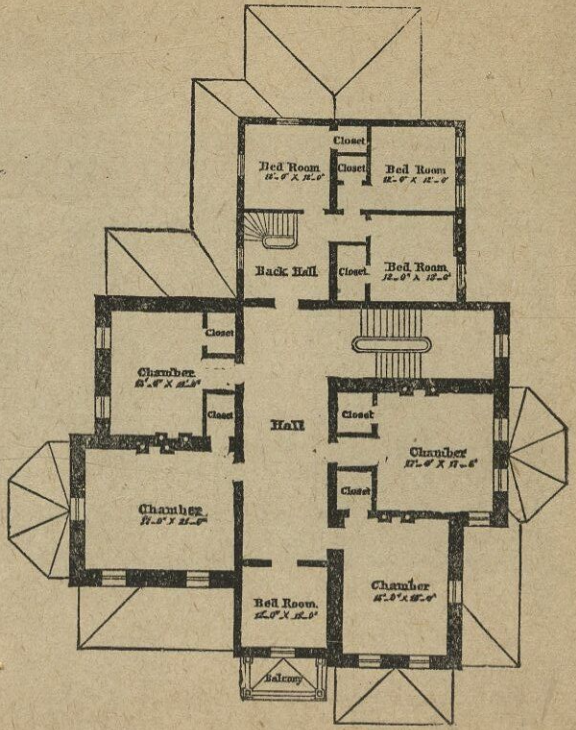
J.H. CARPENTER
Architect
156 Washington St
CHI.



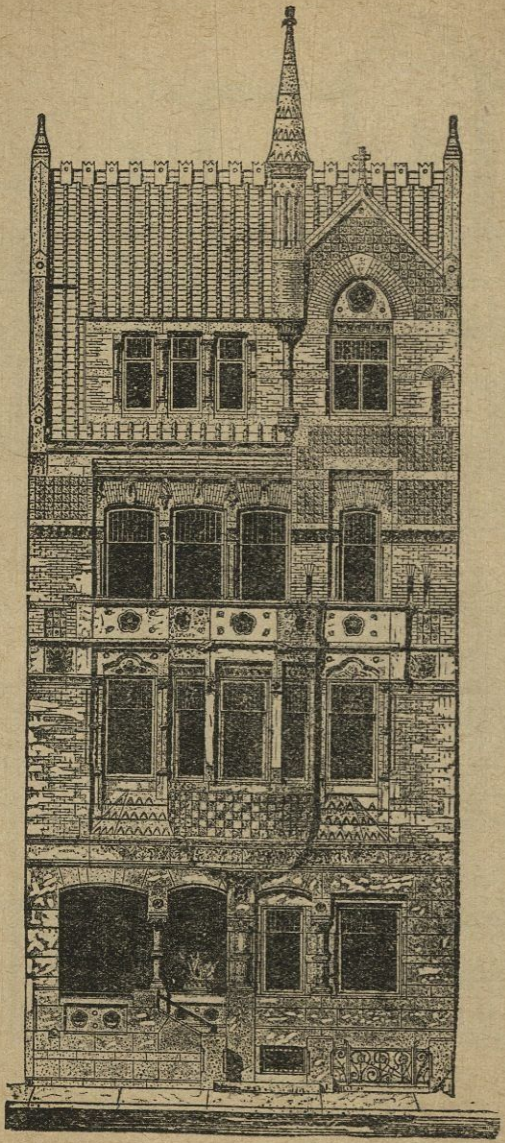
Front Elevation.



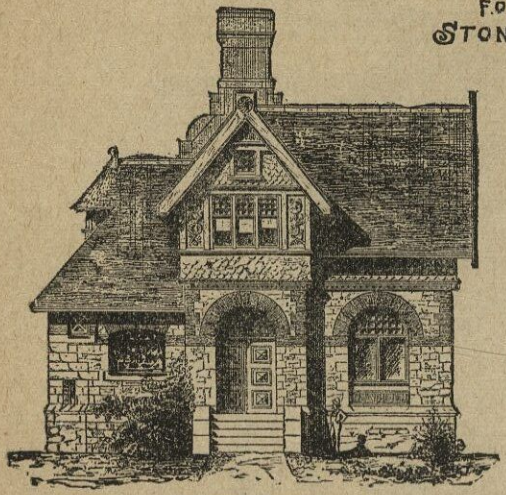
FIRST FLOOR.



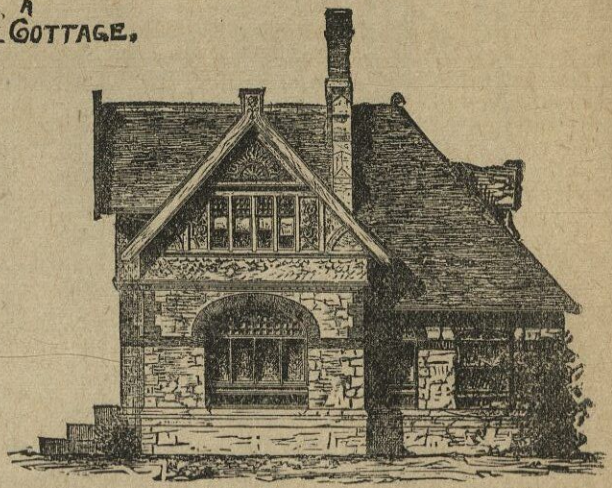
SECOND FLOOR.



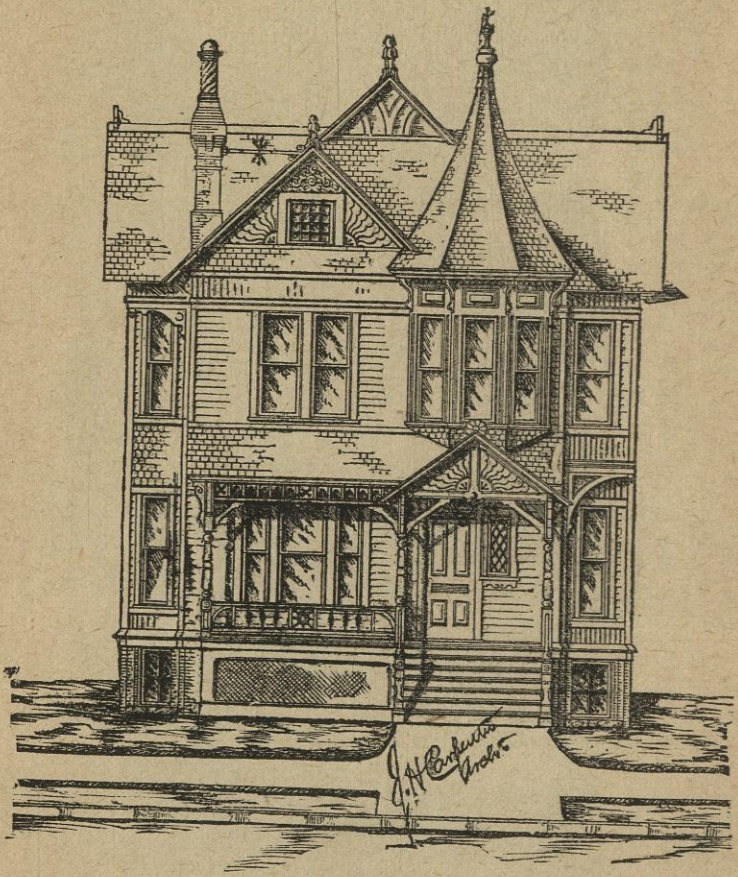
DESIGN FOR A STONE COTTAGE.



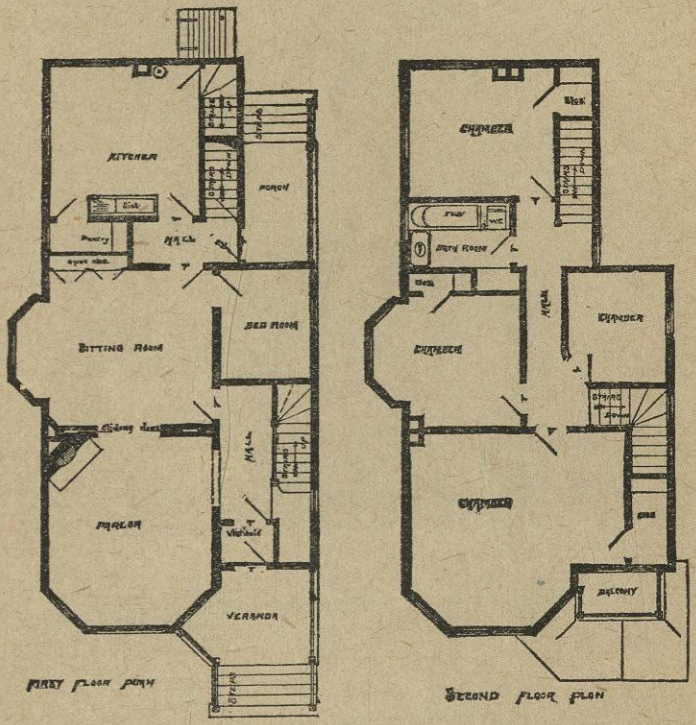
Principal Elevation



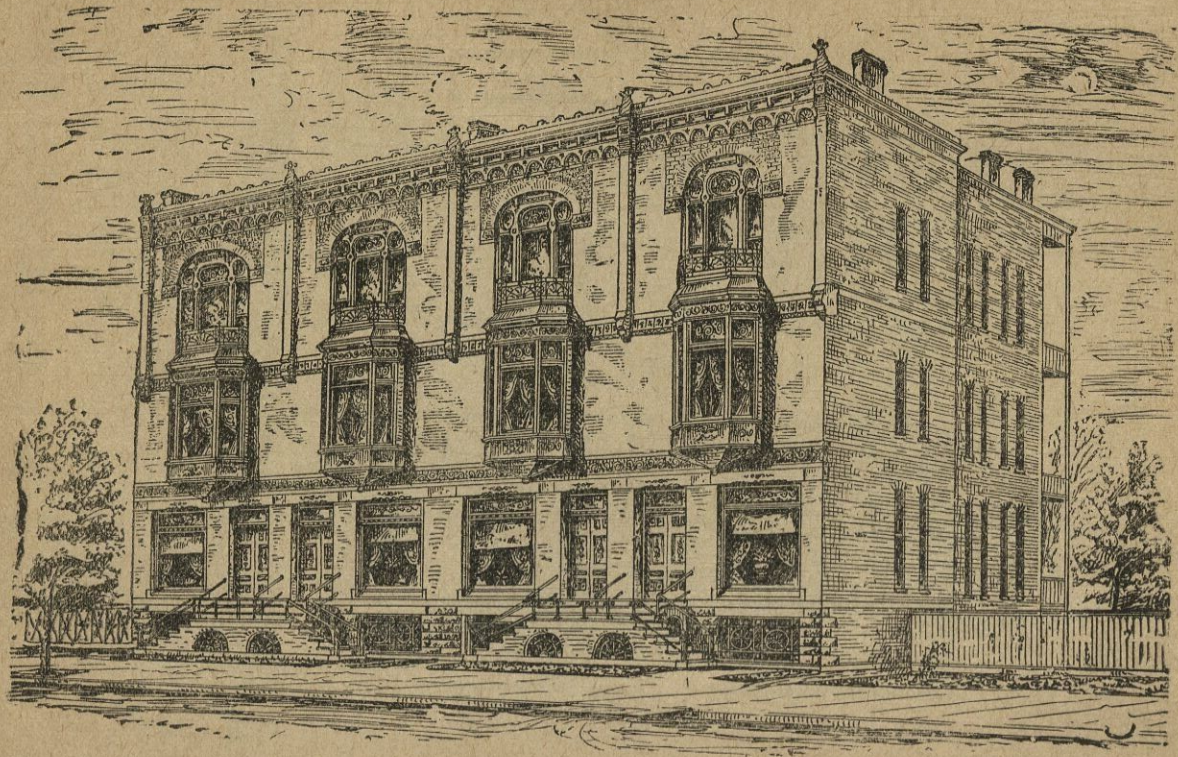
West Elevation

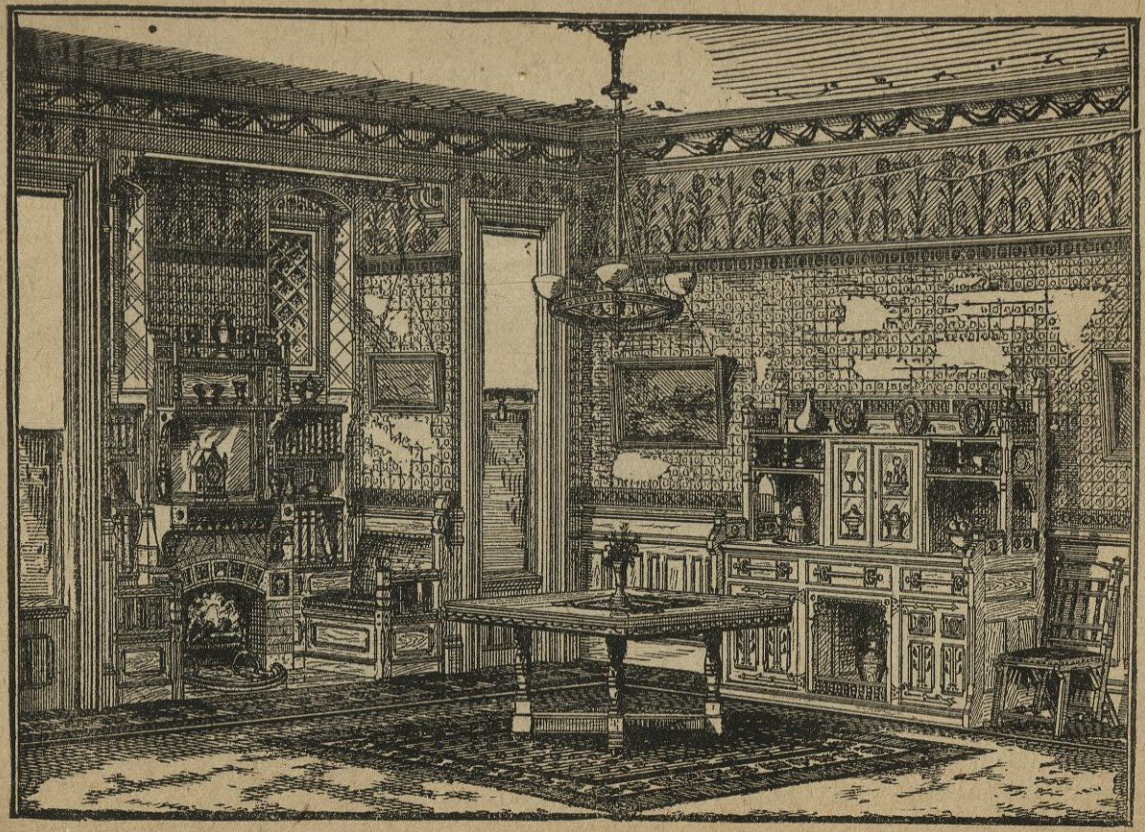


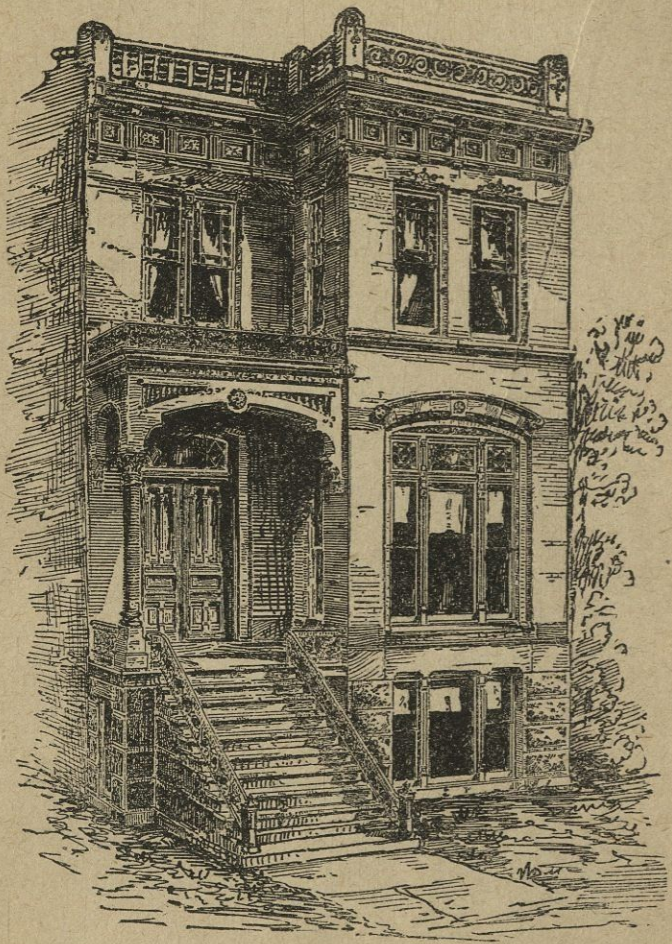
This design is for a ten-room frame suburban residence. Is very pretty in arrangement and design. The cost of the building will vary from $3,500 to $5,000.

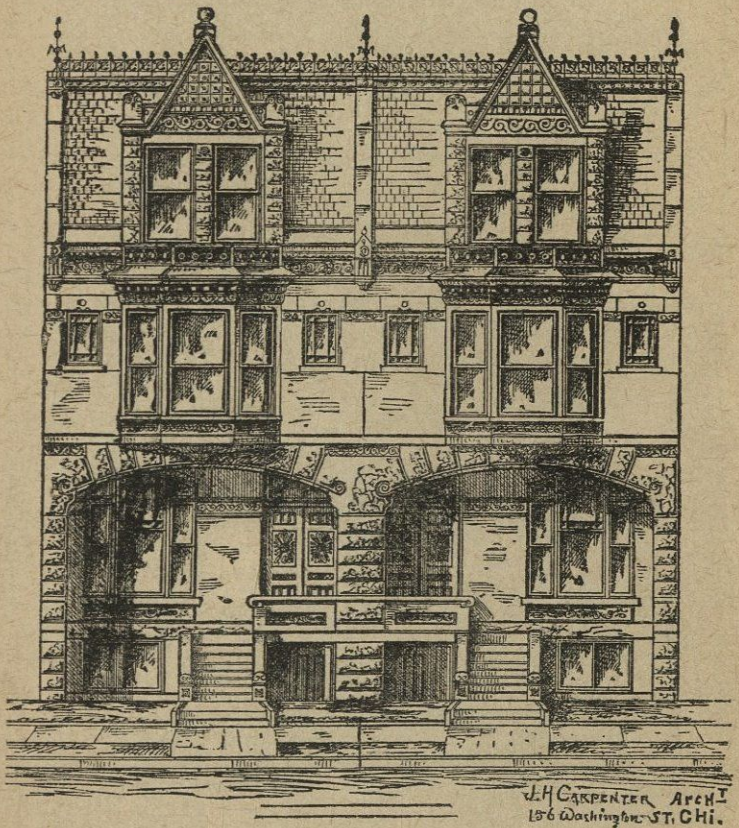


These plans are for a detached residence, of wood or brick, costing from $3,500 to $4,500, according to finish. Admits of a stylish design. Is very convenient, and suitable for a family of six.

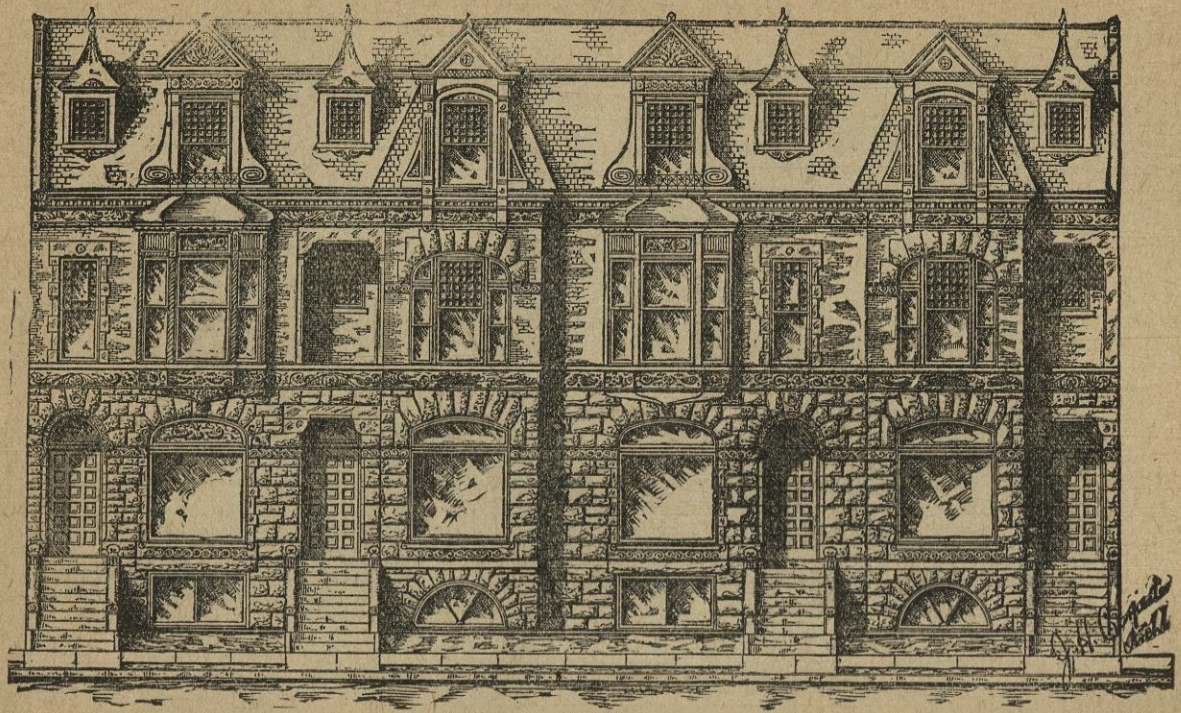




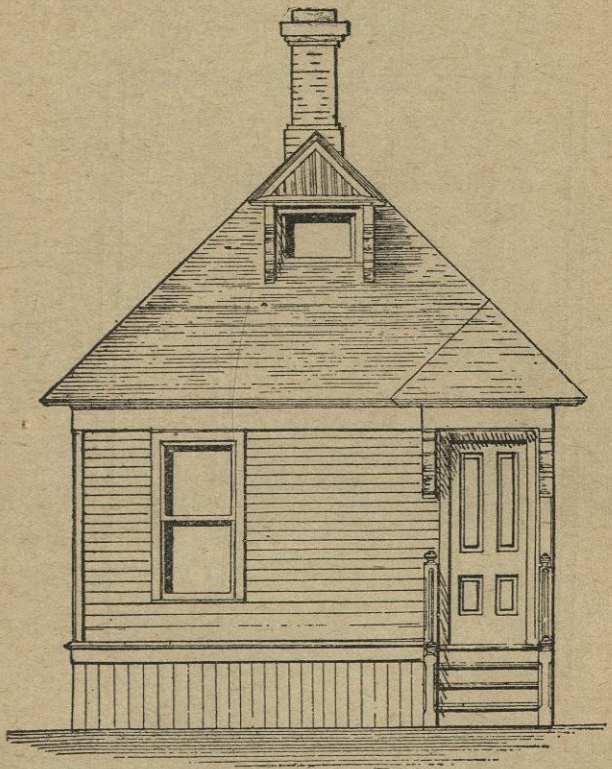




This design is for residences or flats, and suitable for shallow lots. They can be built for about $5,500 each.

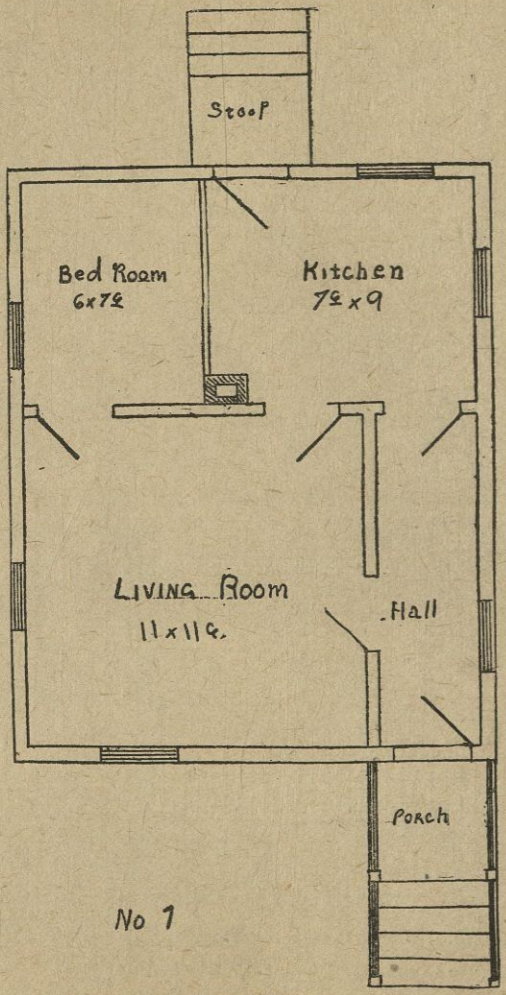


DESIGN FOR FOUR HOUSES ON 75 FEET.

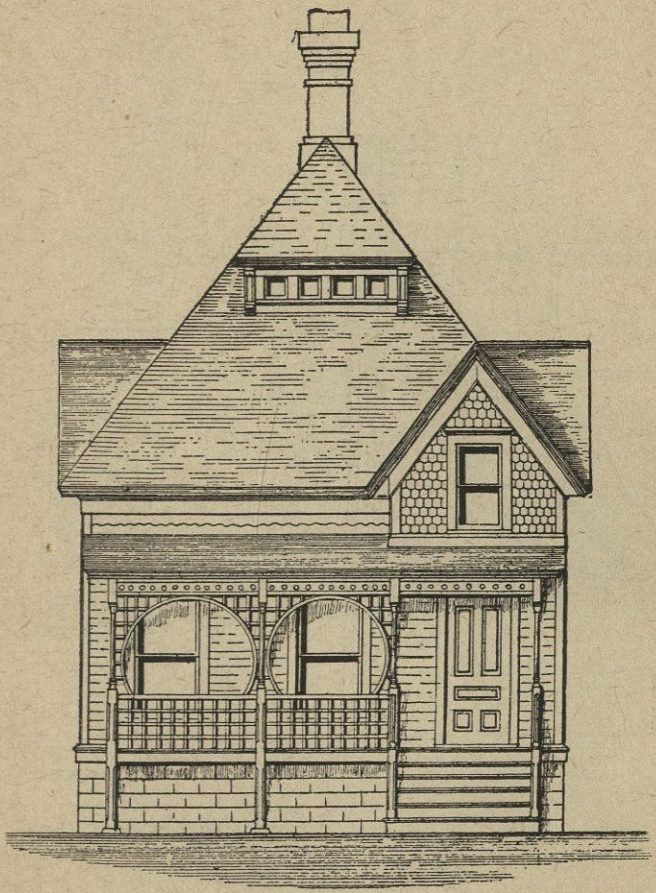


No. 1.—FRONT ELEVATION.

Design No. 1. Cheap Cottage. Set on Posts. Cost, $476.00.
No Plumbing. Roofing, Bodine or Shingle.


Stoop
Bed Room
6x7½
Kitchen
7½x9
Living Room
11x11½
Hall
Porch
No 1

FLOOR PLAN.

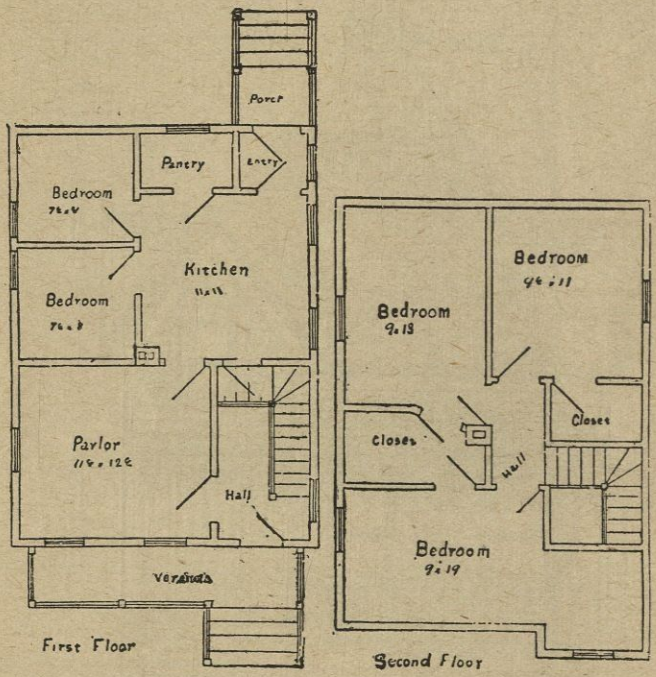


No. 2.—Front Elevation.

Design No. 2. Small Frame Cottage. Cost, $1,088.00.

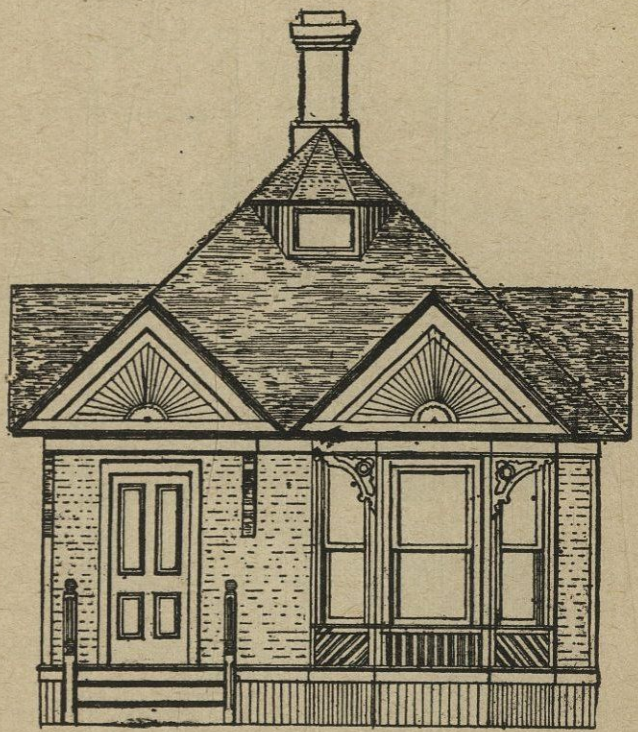
Without Foundation and on Posts, $993.00.

No Plumbing. A neat Suburban or Village Cottage where cost is a consideration.


Porch
Pantry
Entry
Bedroom
7'6 x 9'
Kitchen
11'x11'
Bedroom
7'6 x 9'
Parlor
11'6 x 12'6
Hall
Veranda
First Floor
Bedroom
9'x11'
Bedroom
9'x13'
Closet
Closet
Hall
Bedroom
9'x19'
Second Floor

No. 2.

No. 2.

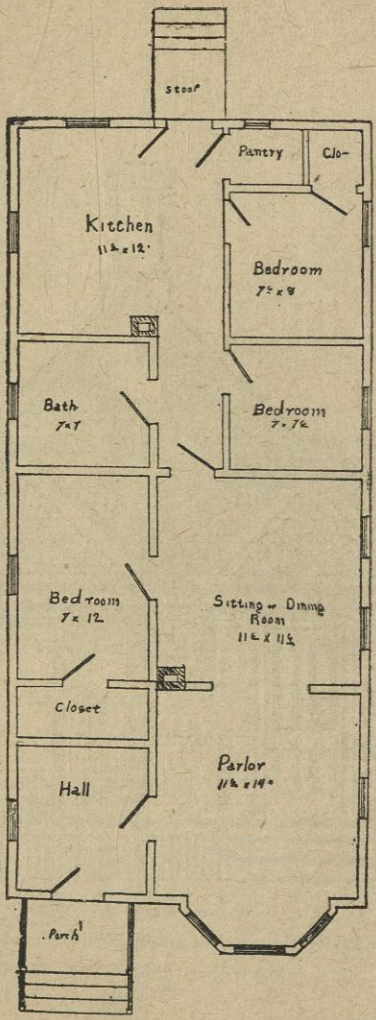


No. 3.—FRONT ELEVATION.

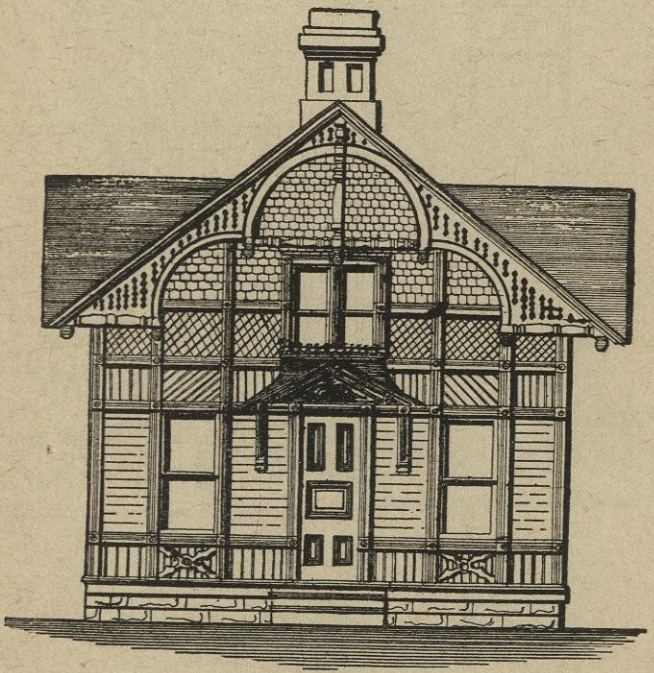
Design No. 3. One story Frame Cottage of 8 rooms.

Cost without Foundation, $1,325.00
" " Plumbing, 1,150.00

A good Tenant Cottage and a neat and roomy workingman's home
One likely to be generally adopted.



No. 3.—Floor Plan.

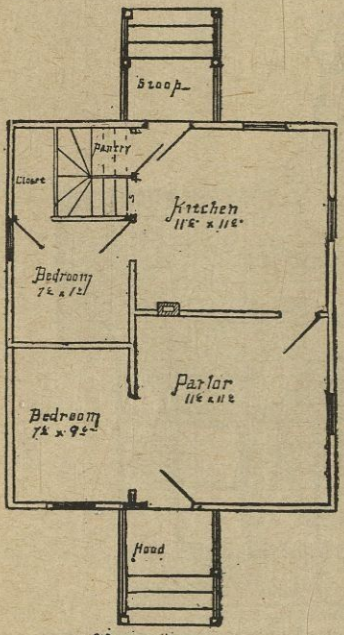


No. 4.—Front Elevation.

Design No. 4. A beautiful Park Cottage. Probably the neatest and roomiest house for the money ever presented.

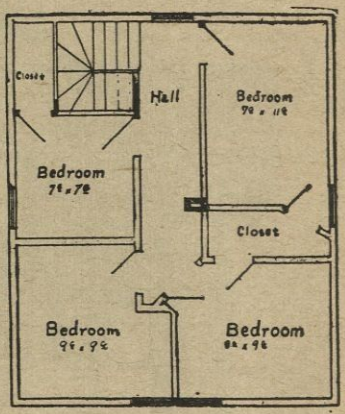
Cost,	- - - - -	$1,389.00
"	without plumbing, - -	1,214.00
"	" " or foundation,	1,038.00

Can be built as low as $800.00 in some localities and under some circumstances.



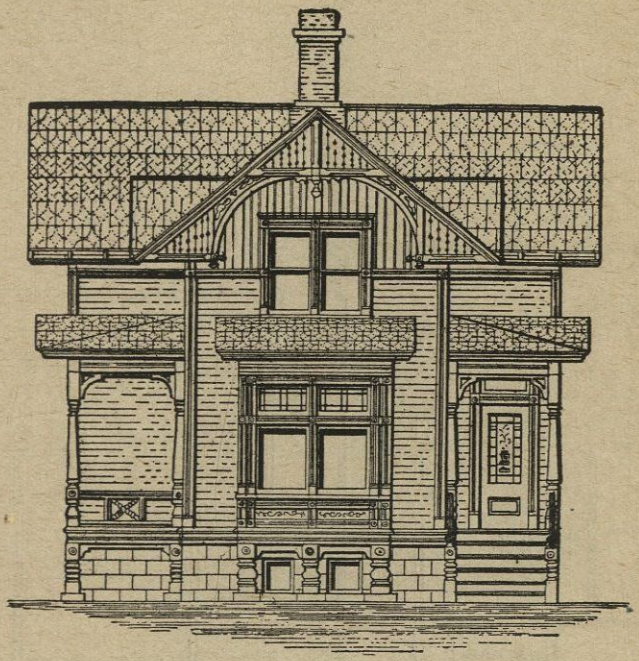
First Floor

No. 4.



Second Floor

No. 4.

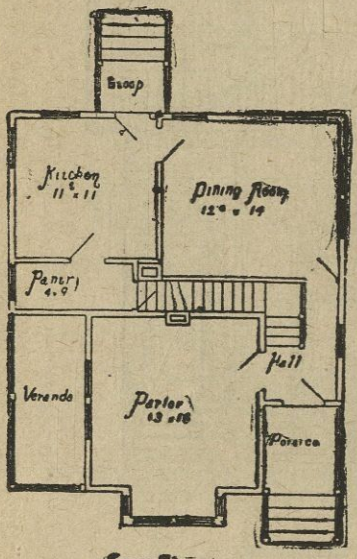


No. 4½.—Front Elevation.

Design 4½. A Village Residence.

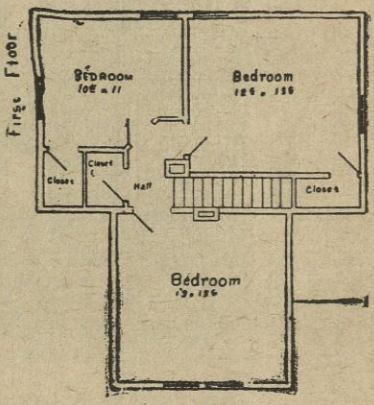
Cost, - - - - - -	$1,867.00
" without plumbing, - -	
" " foundation, - -	1,600.00

This structure is a favorite in western towns.



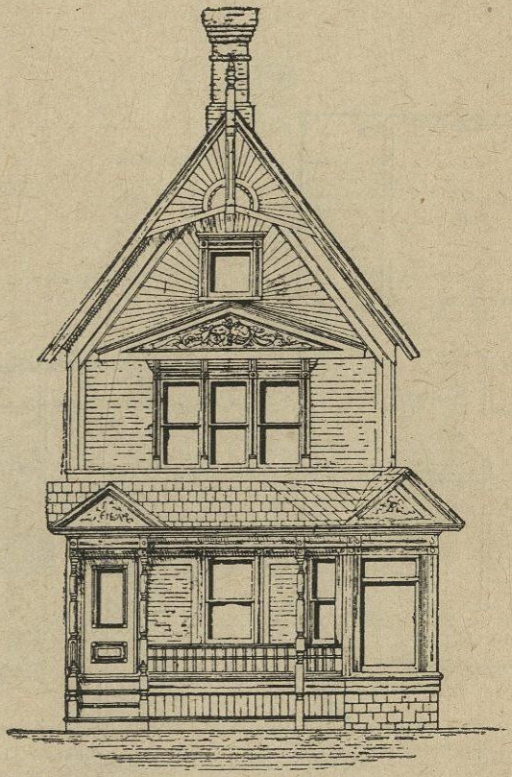
First Floor

No. 1½



Second Floor

No. 1½

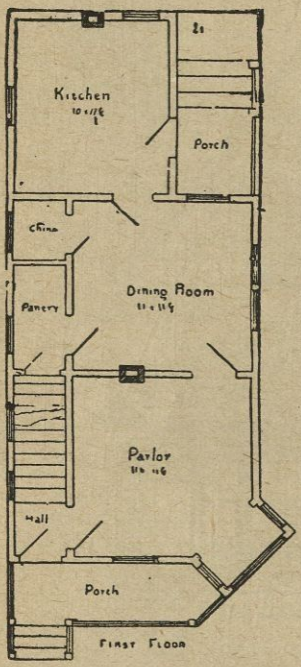


No. 5.—FRONT ELEVATION.

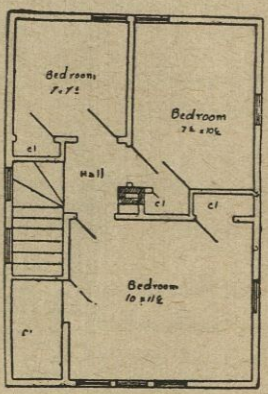
Design No. 5. Cottage for Narrow Lot.

Cost complete, - - - -	$1,667.00
" without plumbing, - -	1,400.00
" " " or foundation,	1,215.00

This design is intended for a narrow city lot, and is both handsome, cheap and convenient.

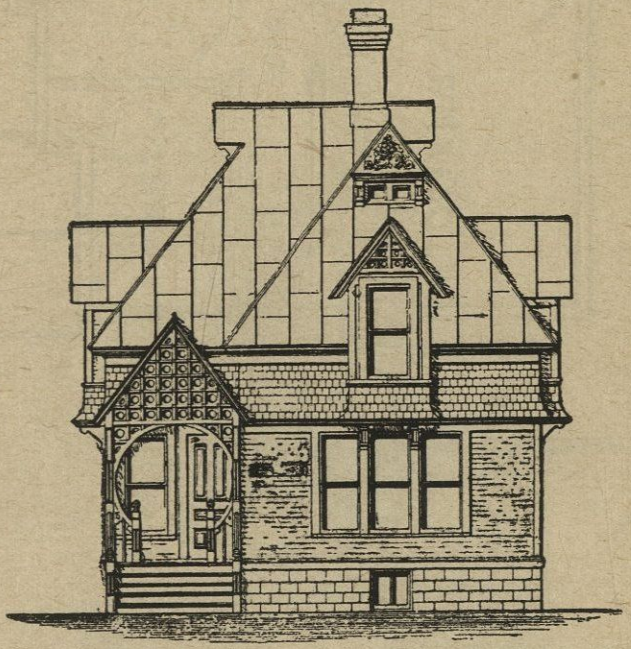


No. 5.



Second Floor

No. 5.

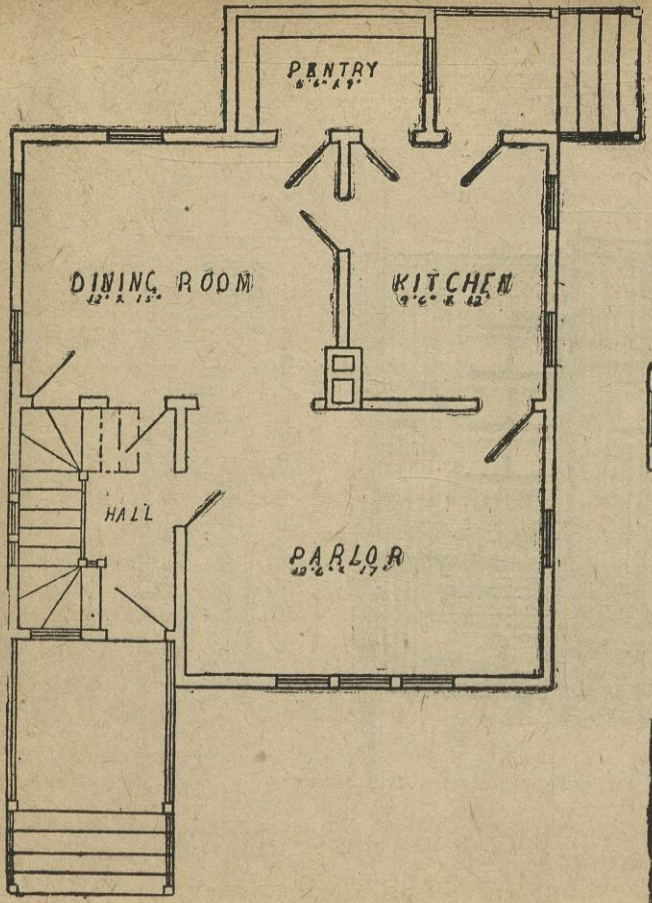


No. 6.—FRONT ELEVATION.

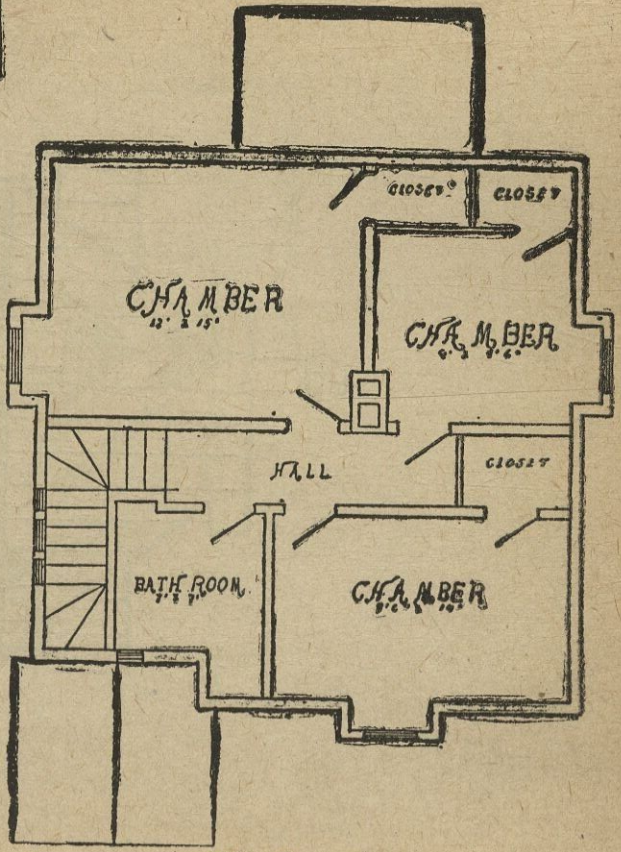
Design No. 6. A Modern Cottage.

Cost complete, - - - -	$1,953.00
" without plumbing, - -	1,773.00
" " " or foundation,	1,513.00

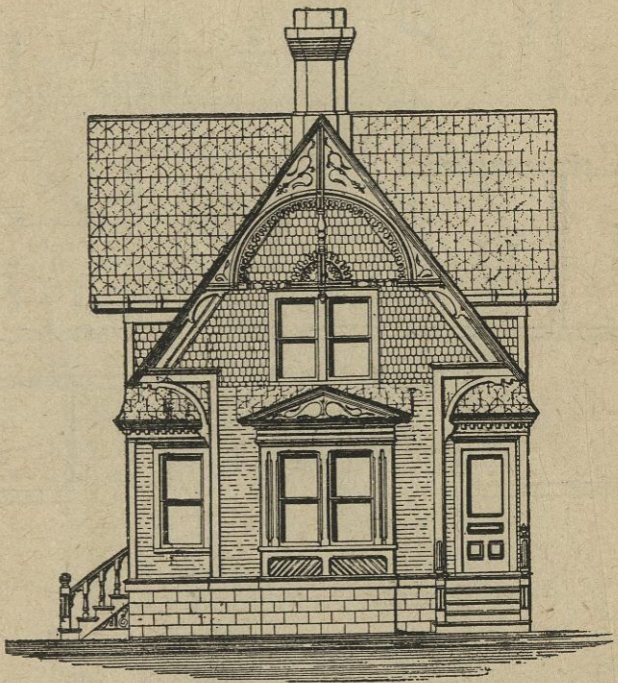
This is a favorite with the residents of the suburban towns, and, considering its size and appearance, is very inexpensive.



No. 6.—First Floor.



No. 6.—Second Floor.

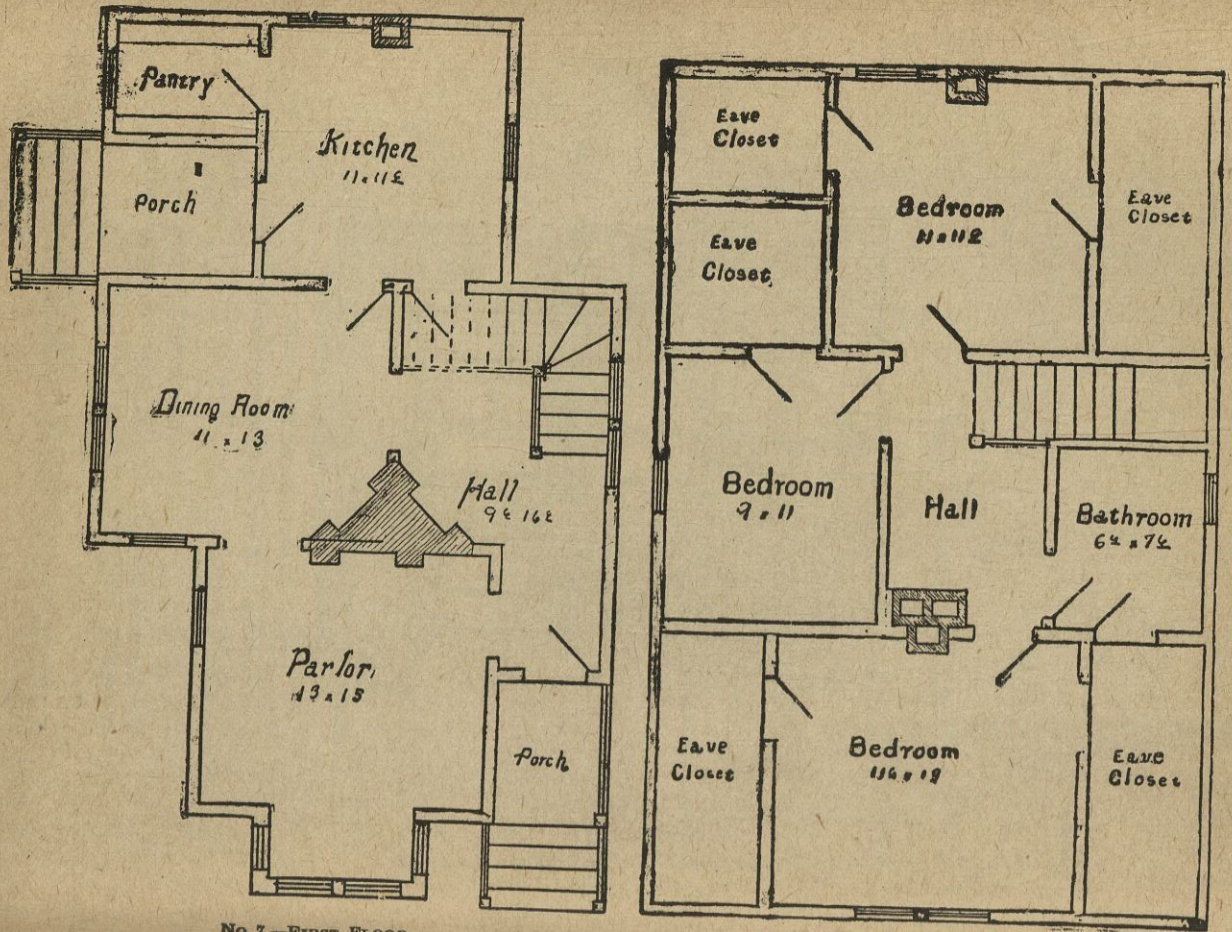


No. 7.—Front Elevation.

Design No. 7. A very Handsome and Convenient Cottage.

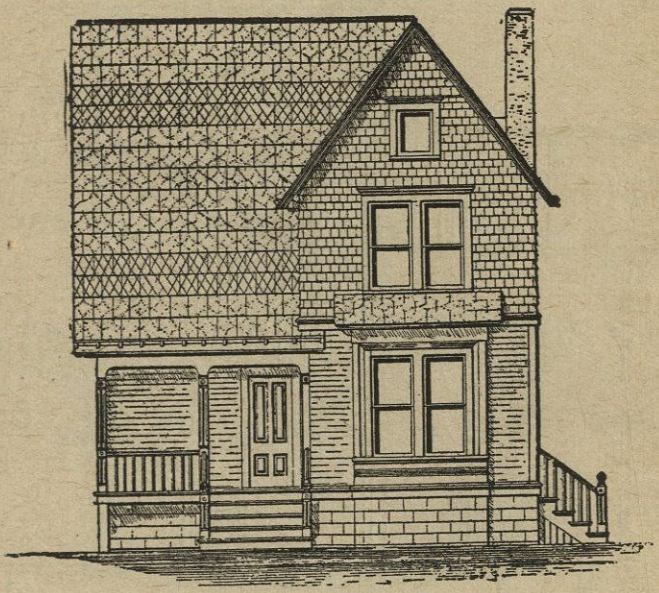
Cost complete, - - - - - - -	$2,223.00
" without plumbing, - - - - -	2,088.00
" " " foundation or fireplaces, etc.,	1,700.00

This Cottage ought to be a general favorite, considering its beauty and cheapness.



No. 7.—First Floor

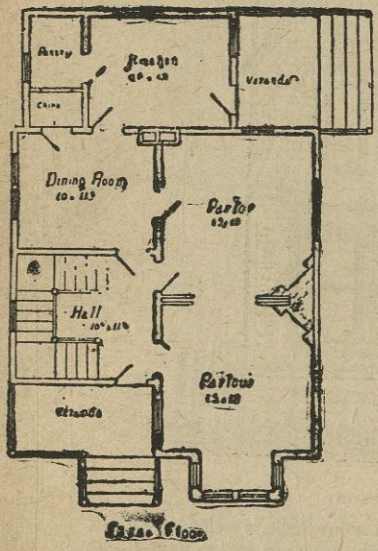
No. 7.—Second Floor.



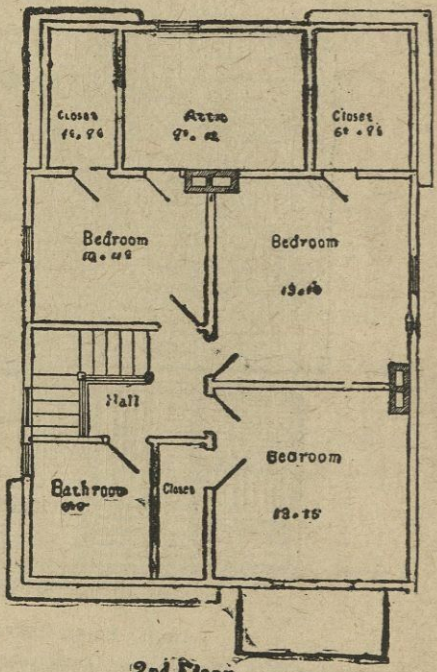
No. 8.—Front Elevation.

Design No. 8. This Cottage, in the Queen Anne Style, is well adapted to the suburbs of large cities, is comfortable and neat as well as roomy.

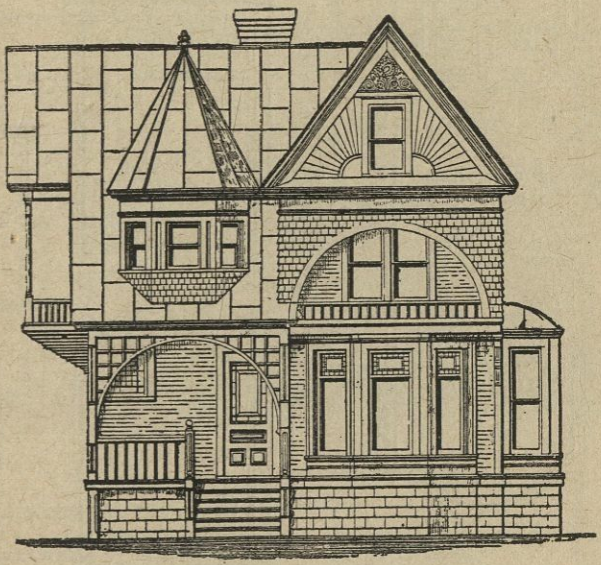
Cost complete, - - - - - -	$2,359.00
" without plumbing, - - - -	2,100.00
" " " foundations or Mantels,	1,680.00


Dining Room
Parlor
Hall
Parlor
2nd Floor

No. 1


Closet
Attic
Closet
Bedroom
Bedroom
Hall
Bedroom
Bathroom
Closet
2nd Floor

No. 2

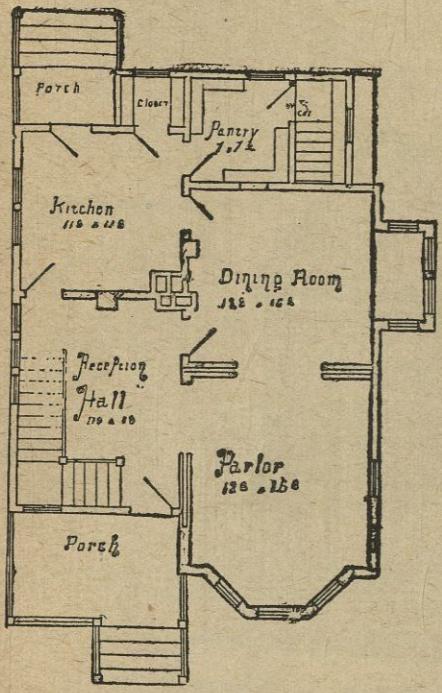


No. 9.—FRONT ELEVATION.

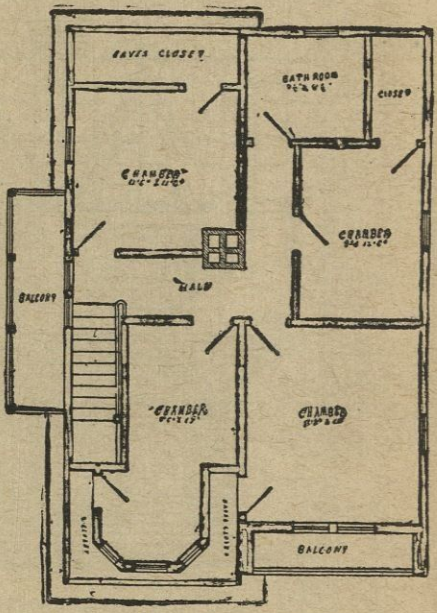
Design No. 9. A Colonial Cottage.

Cost complete, - - - - - - -	$2,456.00
" without plumbing, - - - - -	2,225.00
" " " foundations or mantels,	1,800.00

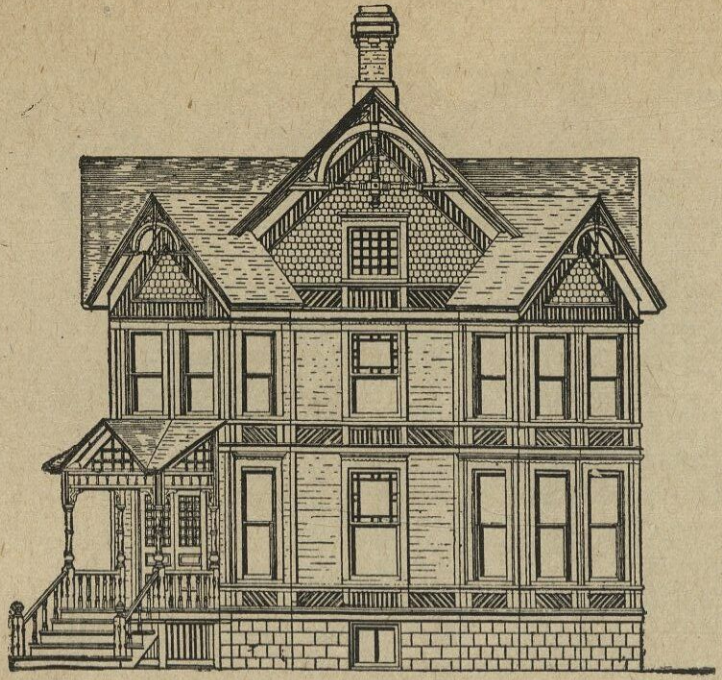
This example of the Colonial style is a fair specimen of the American home of the present day, and is deserving of consideration.



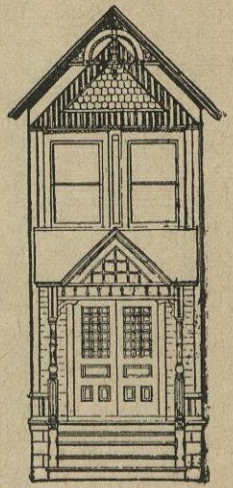
No. 3.—FIRST FLOOR.



No. 3.—SECOND FLOOR.



No. 10.—Front Elevation.



Corner Entrance.

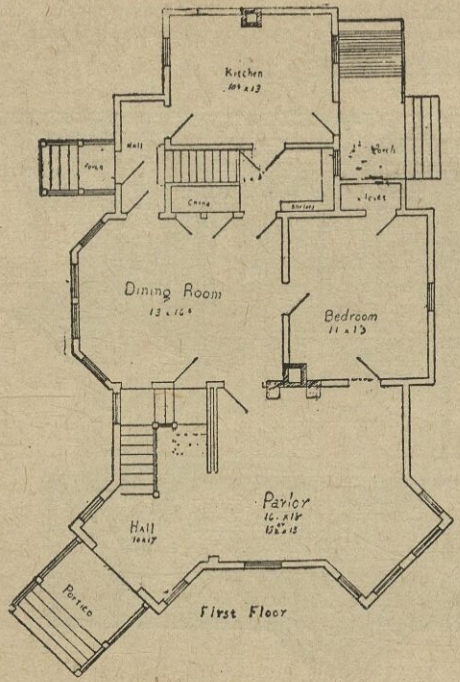
Design No. 10. The Model Cottage.

This is by long odds the best Cottage for the price ever constructed, and is far superior to any in the book. It is a beauty both externally and internally, and as it has been constructed at Ottawa, Ill., for $1,800.00, and at Morris, Ill., for $2,400.00, it will be seen that the cost set in the estimate is sufficiently high enough to cover all incidentals. Try it.

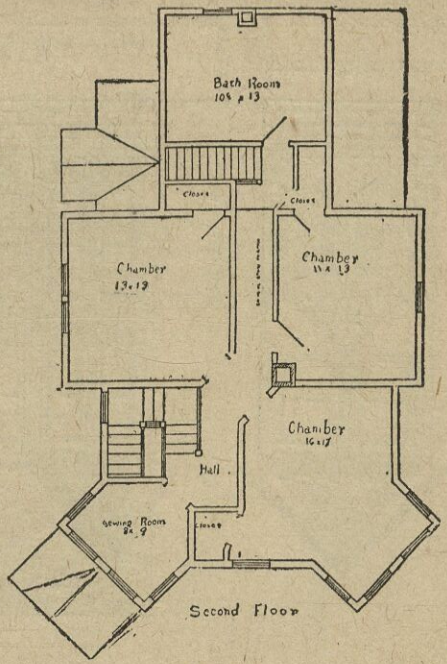
Cost complete, $3,270.00

Cost without plumbing, $3,070.00

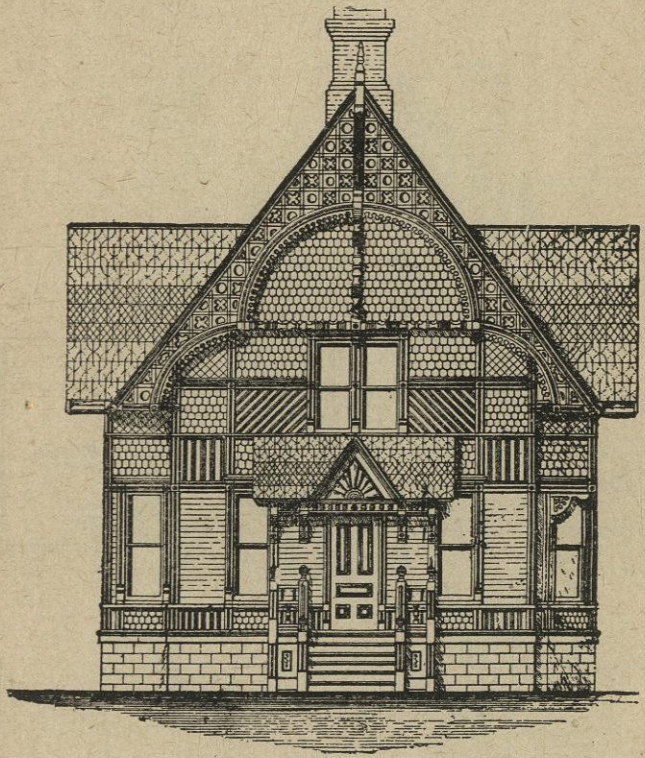
Cost without plumbing, foundation, mantels, etc., $2,470.00


Kitchen
Hall
Dining Room
13 x 16
Bedroom
11 x 13
Hall
Parlor
Portico
First Floor

No. 10.


Bath Room
Chamber
13 x 13
Chamber
Chamber
Hall
Sewing Room
Second Floor

No. 10.

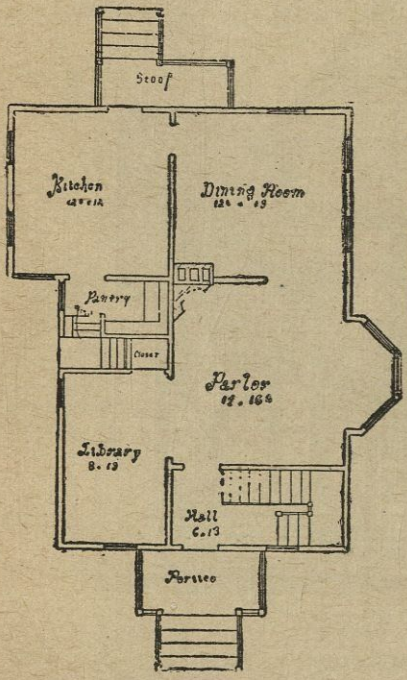


No. 11.—FRONT ELEVATION.

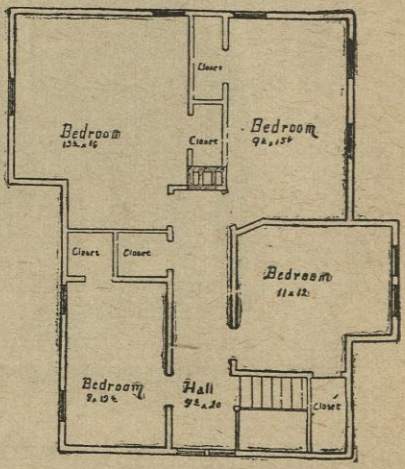
Design No. 11. A Remarkable Building.

Cost complete, - - - - - - -	$2,605.00
" without plumbing, - - - - -	2,395.00
" " " foundation or mantels,	2,090.00

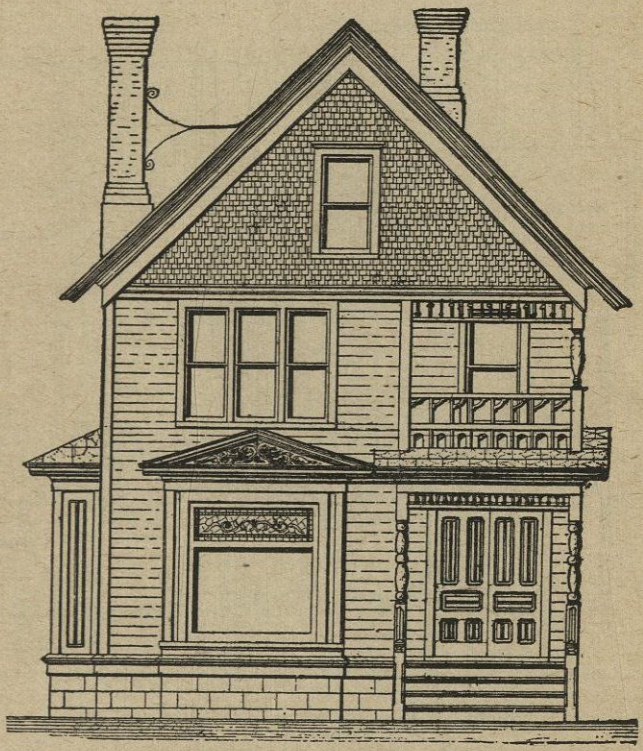
Considering the cost and the phenomenal beauty of this structure, it may be claimed that, with the exception only of design No. 8, it is the best Cottage ever presented to the public. Originally it was designed for the author's own use.



NO. 11.—FIRST FLOOR.



NO. 11.—SECOND FLOOR.

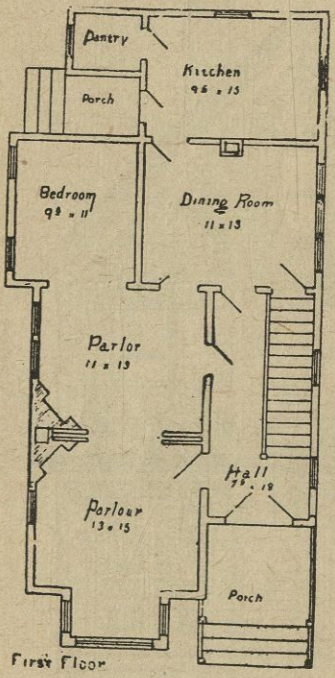


No. 12.—FRONT ELEVATION.

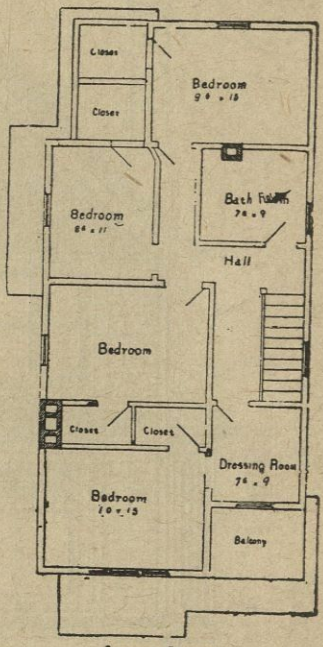
Design No. 12. Dwelling for a Narrow Lot.

Cost complete, - - - - - -	$2,734.00
" without plumbing, - - - -	2,570.00
" " " mantels or foundation,	2,090.00

A neat, comfortable dwelling, well calculated for a narrow lot in a suburban village. It is roomy and well lighted.


Pantry
Kitchen
9.6 x 13
Porch
Bedroom
9.8 x 11
Dining Room
11 x 13
Parlor
11 x 13
Hall
7.8 x 13
Parlour
13 x 15
Porch
First Floor

No. 12.

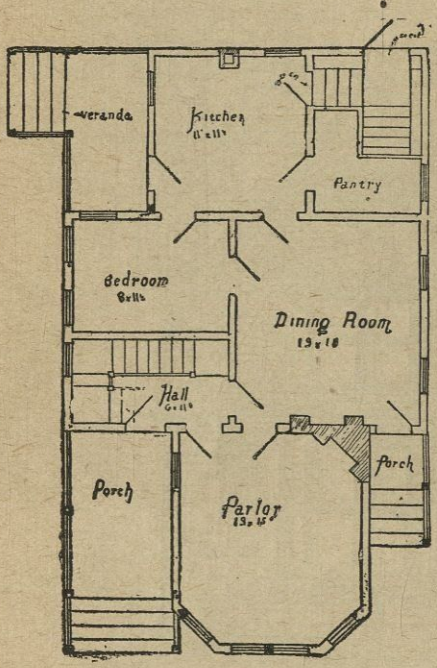

Closet
Closet
Bedroom
9.8 x 13
Bedroom
8.4 x 11
Bath Room
7.4 x 9
Hall
Bedroom
Closet
Closet
Dressing Room
7.4 x 9
Bedroom
10 x 13
Balcony
Second Floor

No. 12.

No. 13. Rural Dwelling.

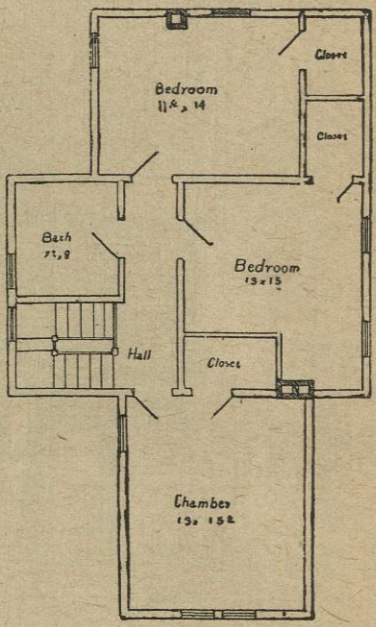
Cost complete, - - -	$2,853.00
" without foundation, etc.,	2,463.00
" " plumbing, -	2,675.00

This would appear well on a fair sized lot among trees and shrubbery. It is a roomy and light structure.



First Floor.

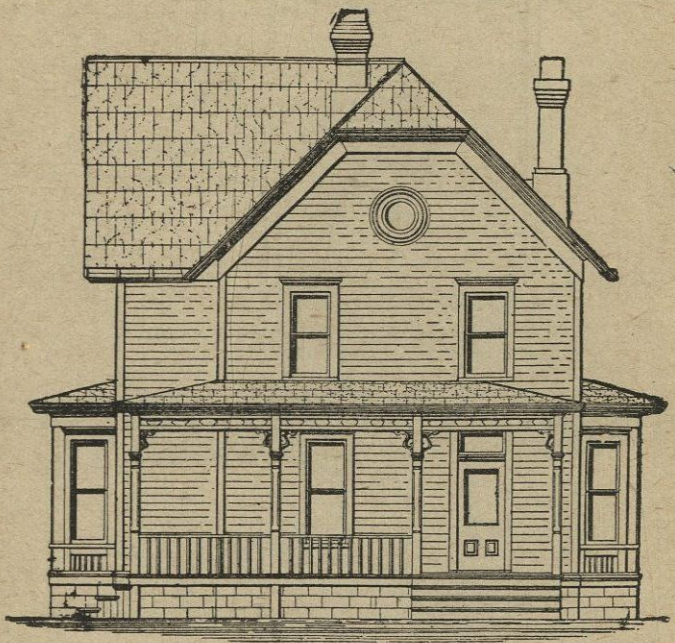
No. 18.



Chamber Plan

No. 13.

42

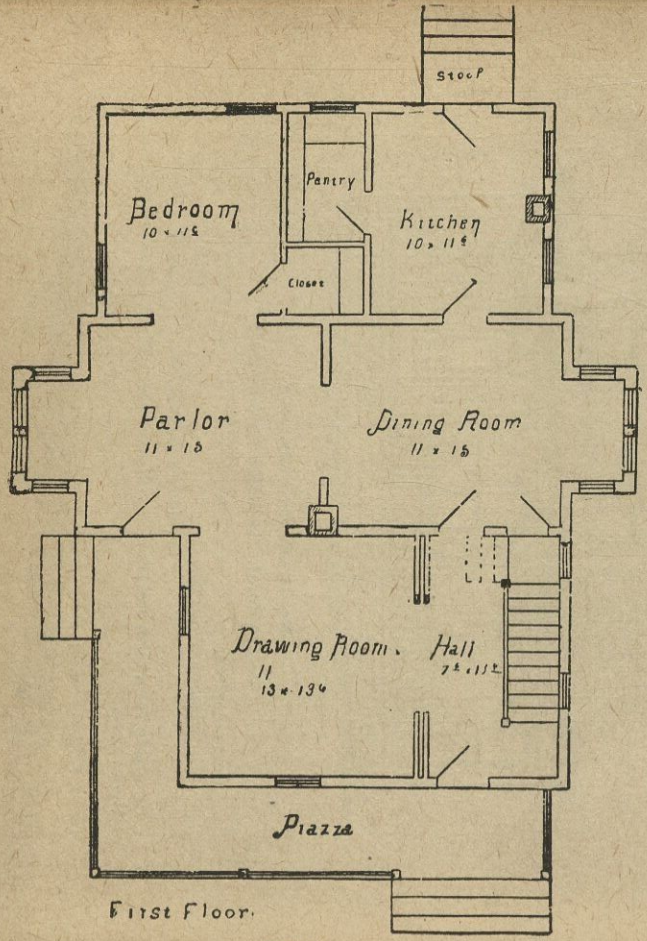


No. 14.—Front Elevation.

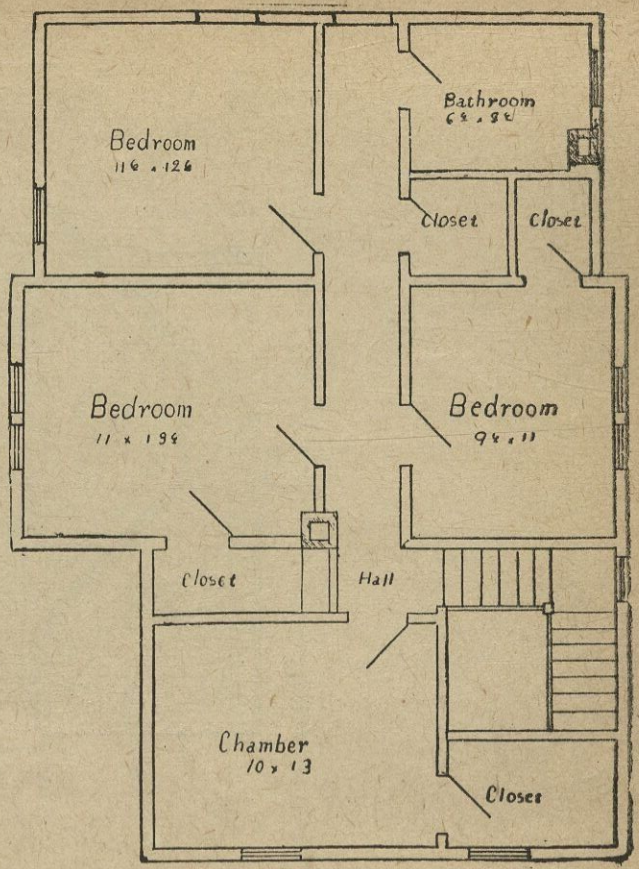
Design No. 14. "Western Farmhouse."

Cost complete, - - - - - -	$2,999.00
" without plumbing, - - - - -	2,824.00
" " " mantels or foundation,	2,310.00

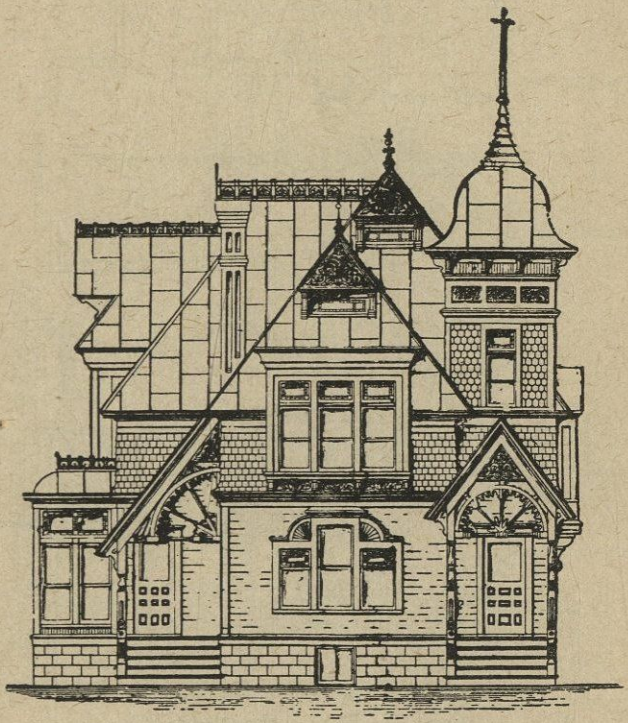
Suitable for a farm residence or village house. Plain, but substantial and neat.



No. 14.



No. 14.—Second Floor.

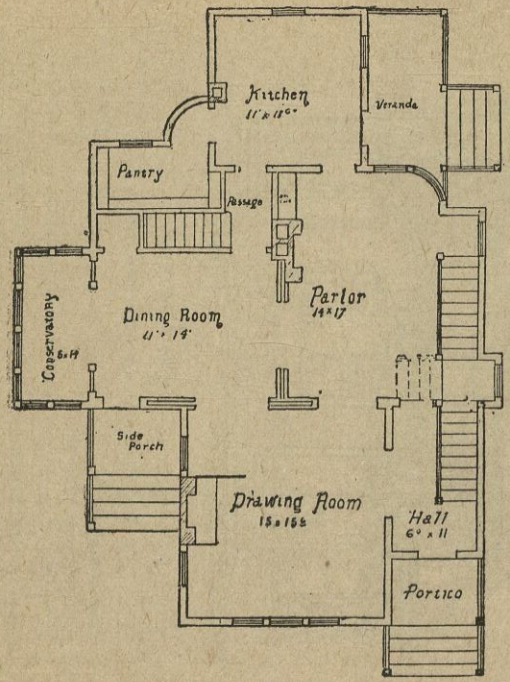


No. 15.—FRONT ELEVATION.

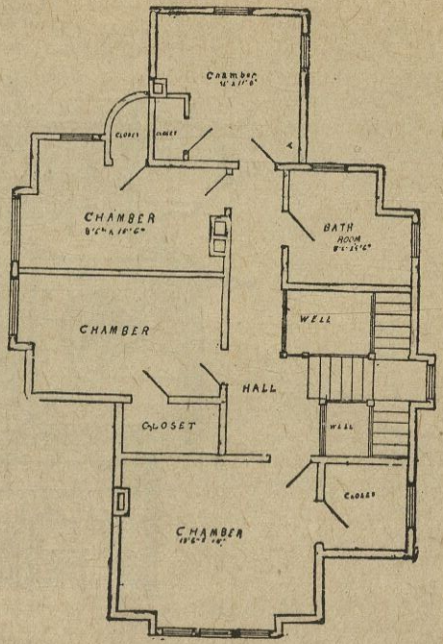
Design No. 15. An American Home.

Cost complete, - - - - - -	$3,037.00
" without plumbing, - - - -	2,835.00
" " " mantels or foundation,	2,335.00

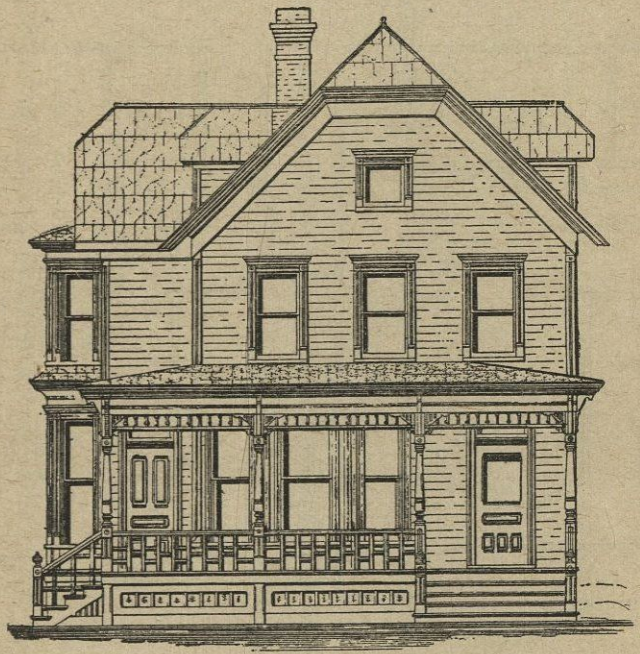
This more than handsome Cottage is peculiarly adapted to positions where trees and shrubbery environ it. We regard it as one of the best designs in the book.



No. 15.—First Floor.



No. 15.—Second Floor.

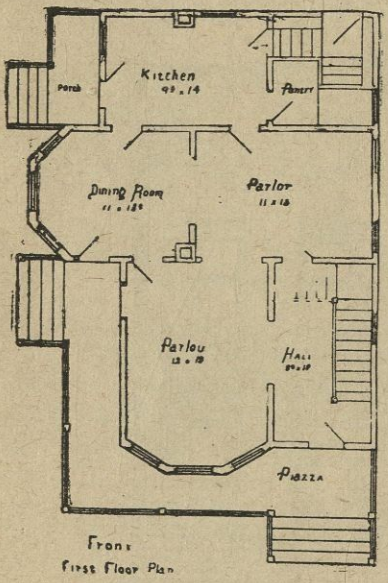


No. 16.—Front Elevation.

Design No. 16. Farm or Village House.

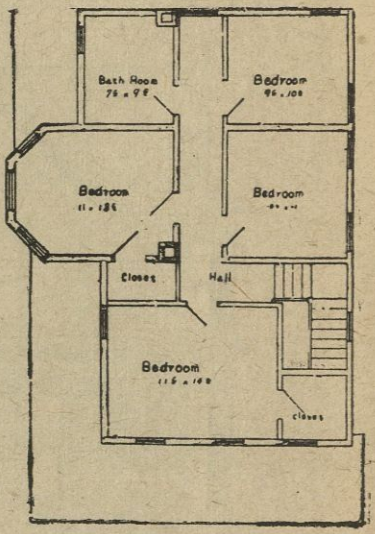
Cost complete, - - - - - -	$3,022.00
" without plumbing, - - - -	2,850.00
" " " mantels or foundations,	2,365.00

Plain, but roomy and substantial. Will have a neat appearance, similar to No. 14.



First Floor Plan

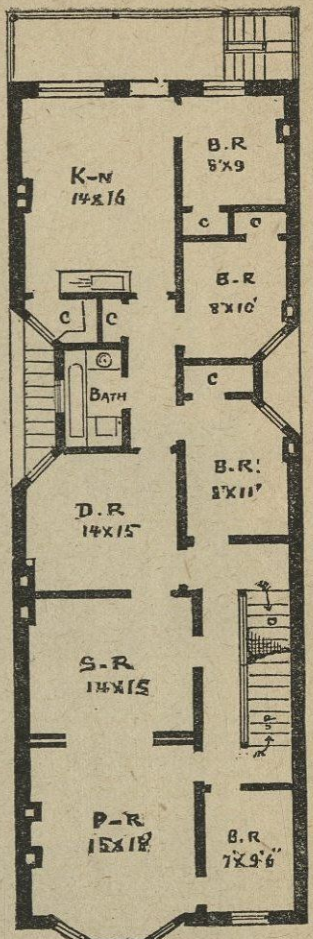
No. 16.



Second Floor

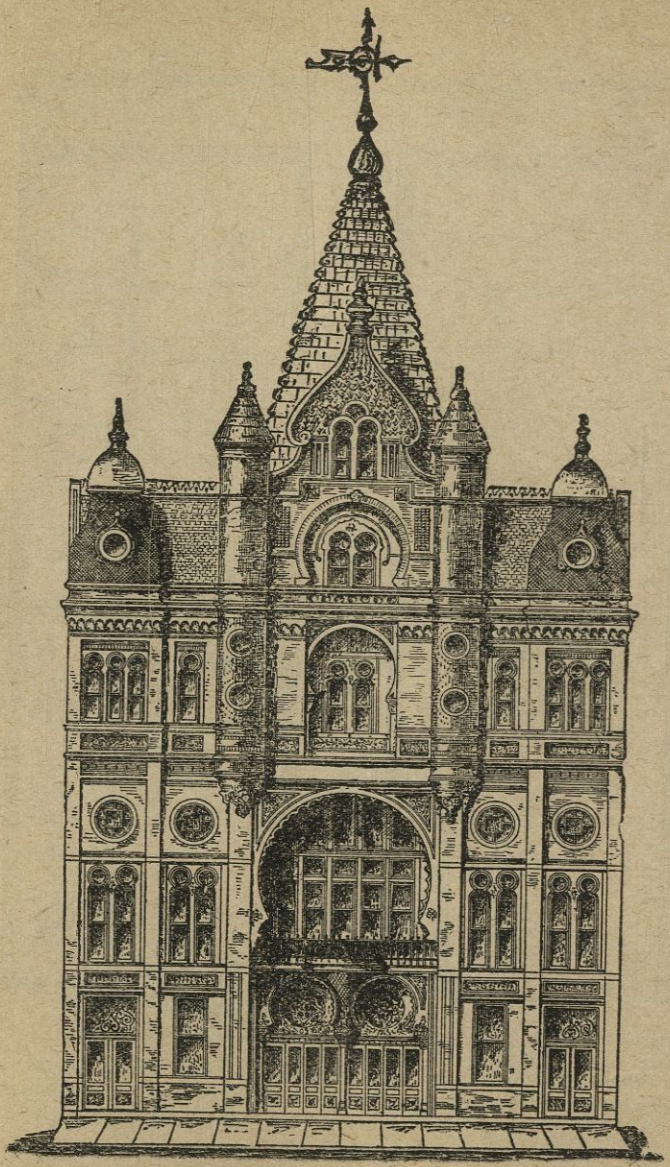
No. 16.

STORE FLOOR.

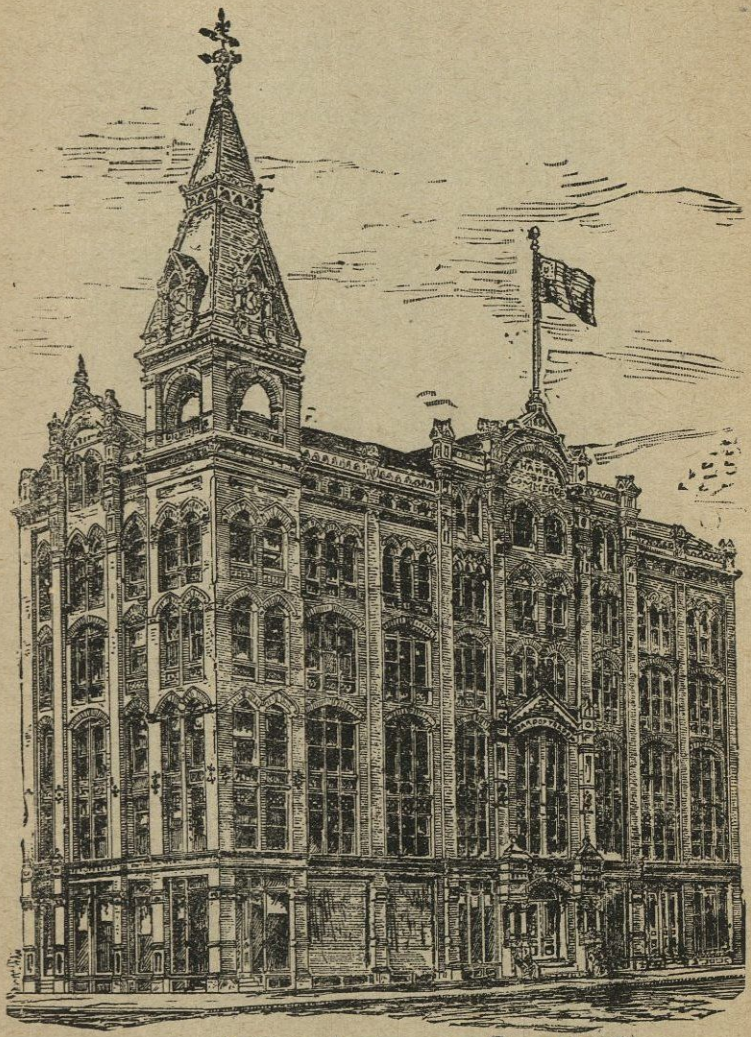


2ND & 3RD STORY.

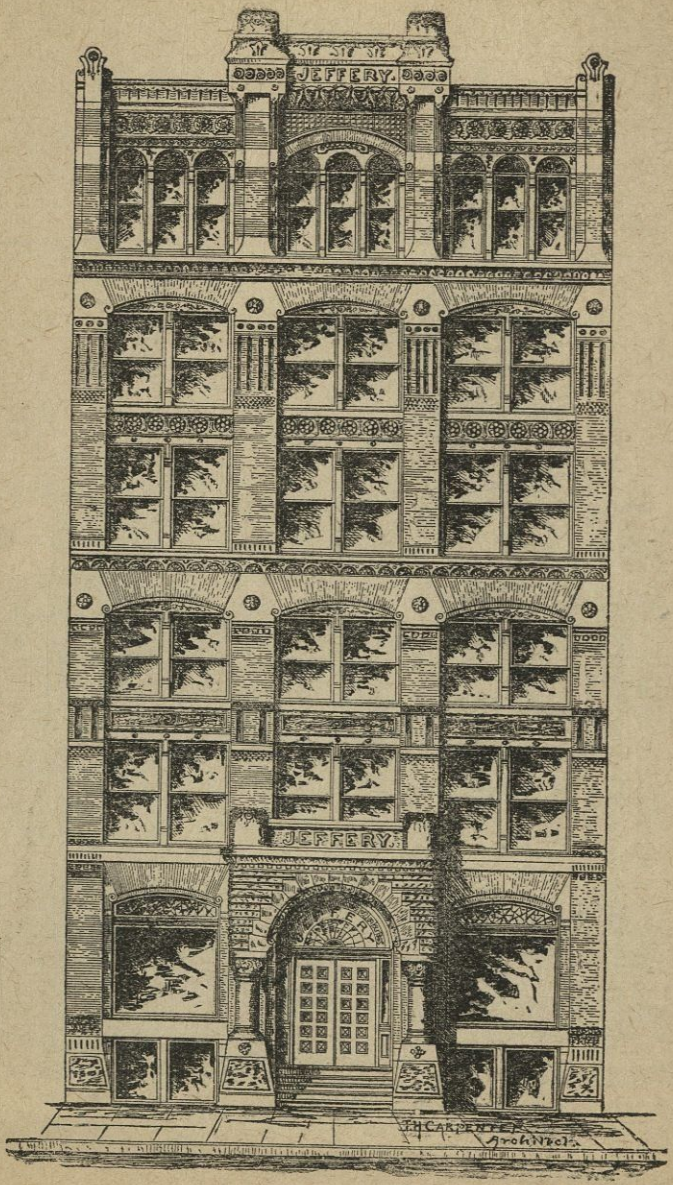
These plans are suitable for a store building for one or more families, or for a building of flats only—a popular style in Chicago—and can be built at very low prices. Each flat has eight rooms, a bath, and all improvements.

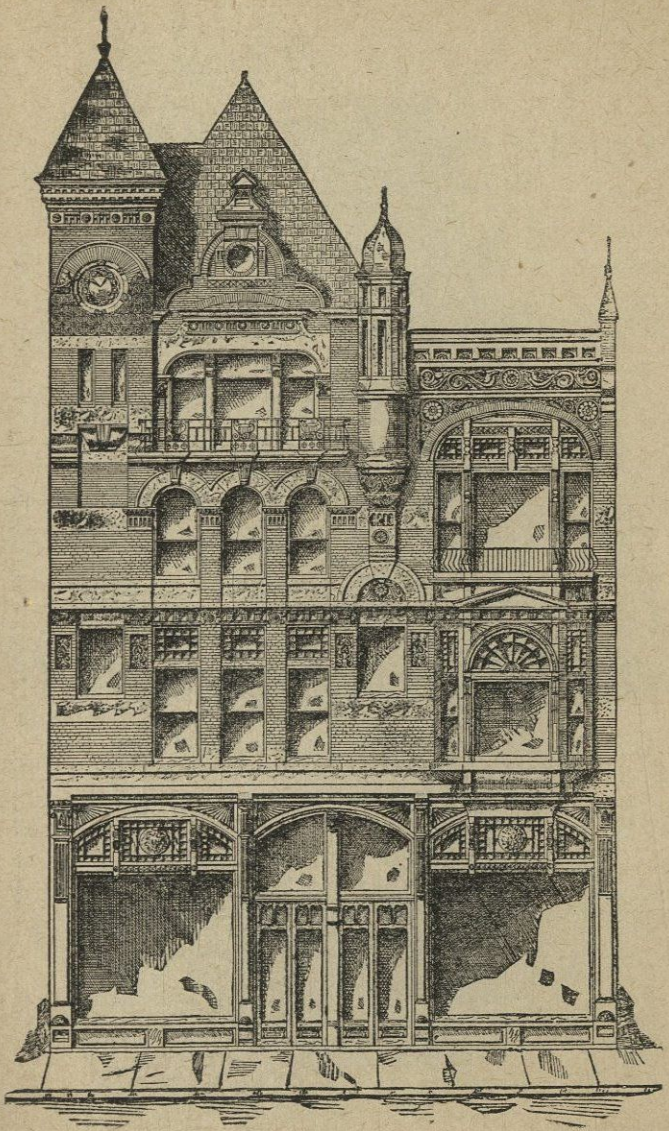


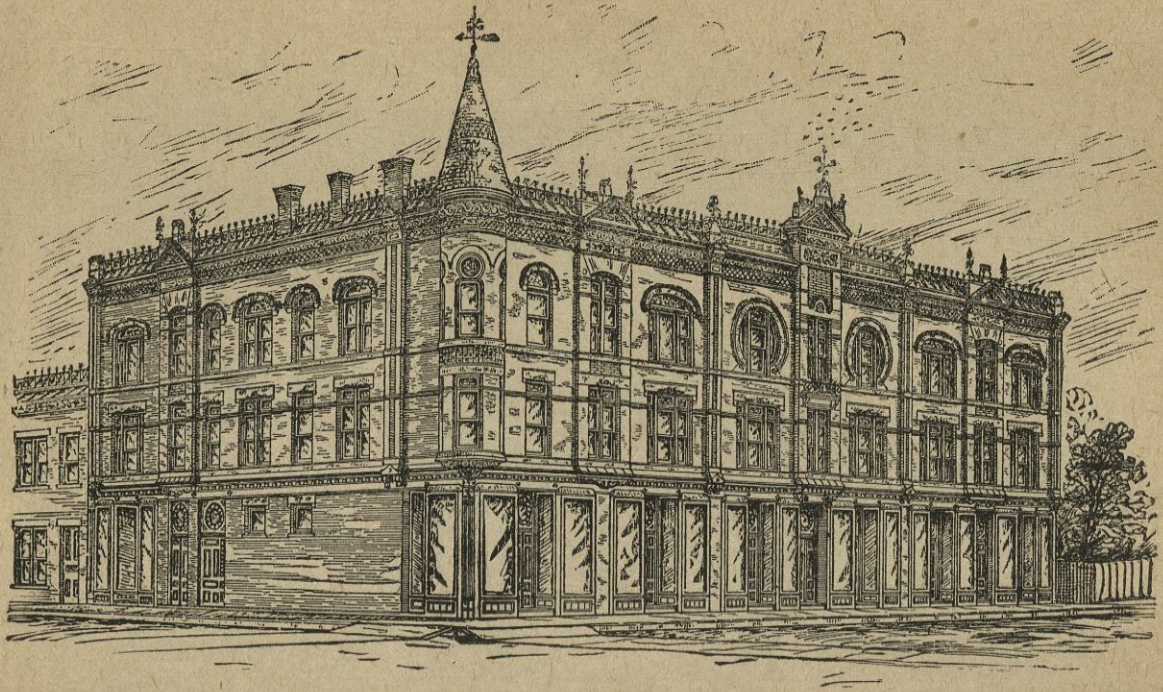
ST. LOUIS OPERA HOUSE.



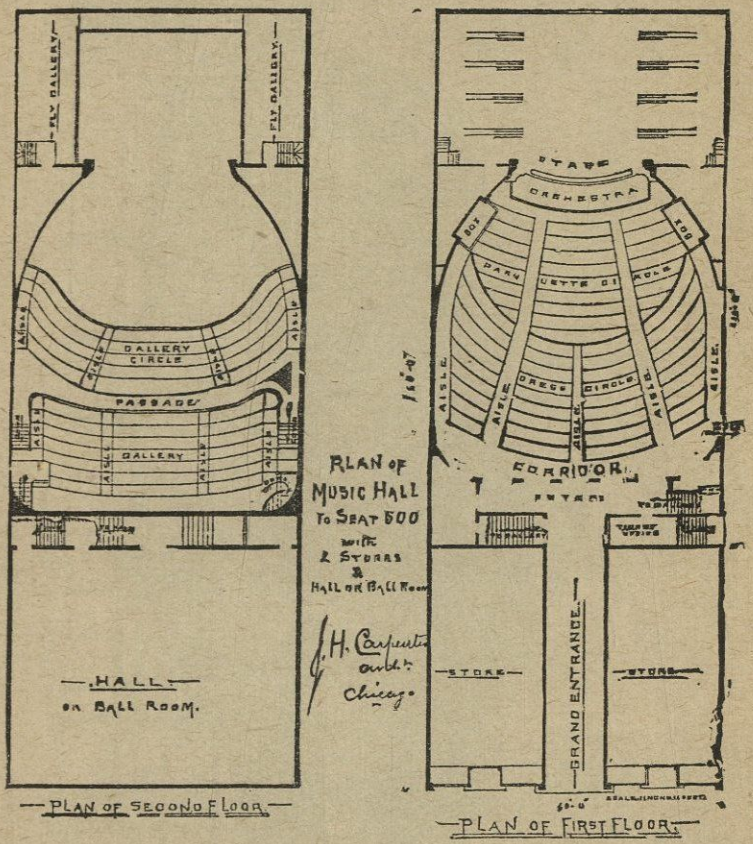
ST. PAUL CHAMBER OF COMMERCE.


JEFFERY.
JEFFERY.
T.H. CARPENTER
Iron Work

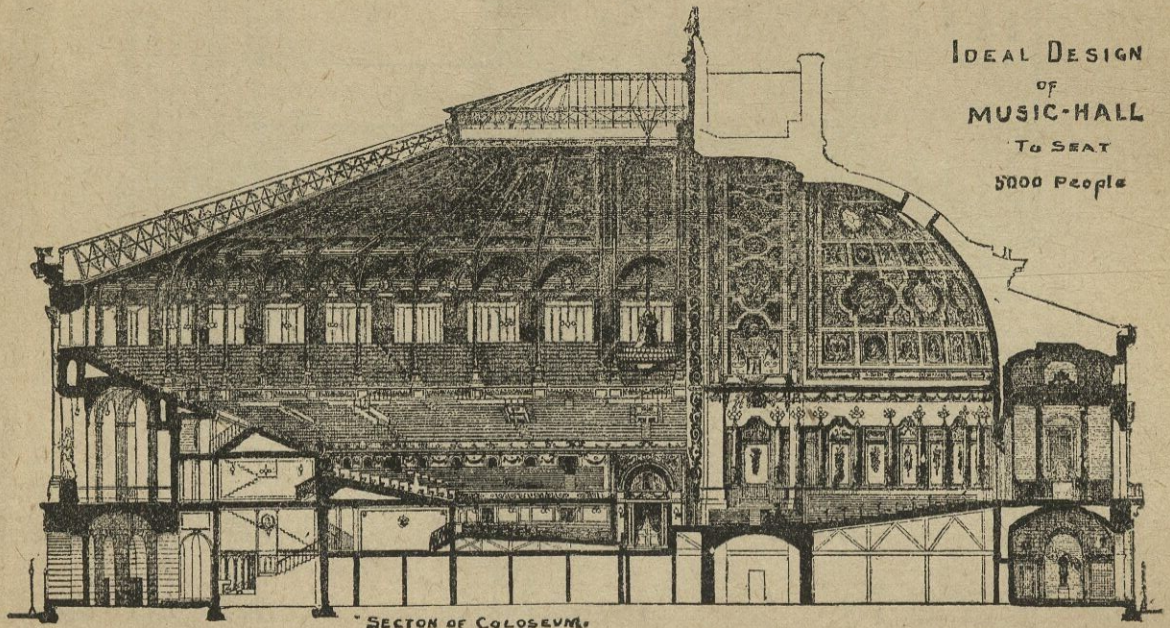




BRAUN BUILDING, COR. THIRTY-FIRST STREET AND SOUTH PARK AVENUE.



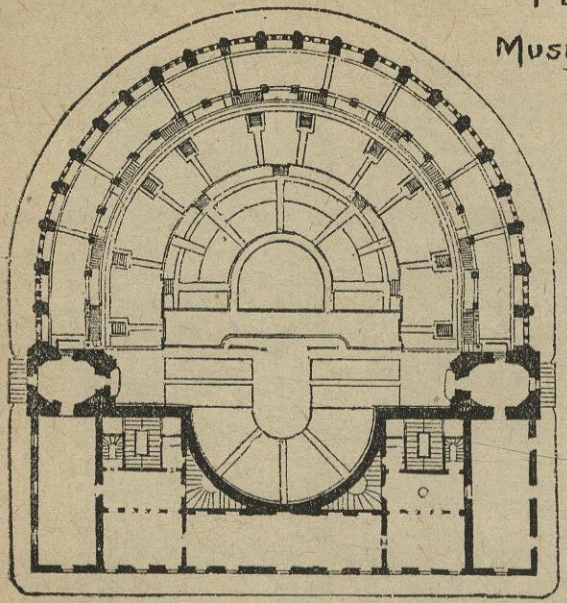
This plan for an Opera House is suitable for a lot 60x150 feet, with Entrance Hall on ground floor. It can be adapted to a second story Hall by adding a grand stair-case. The cost of building will be $25,000, upward, according to style of finish.



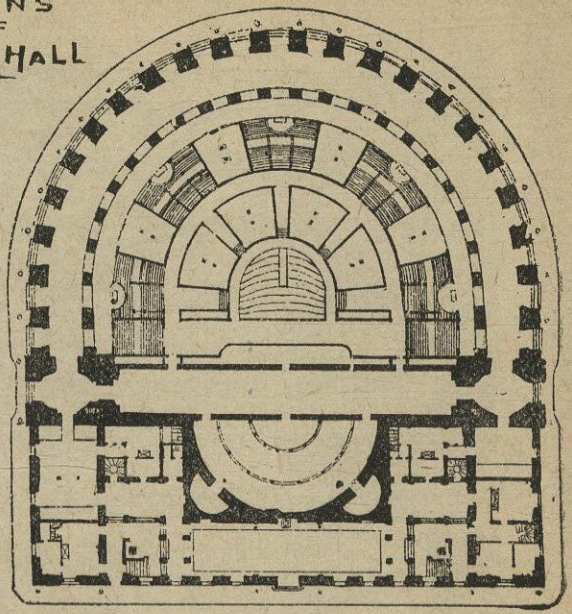
IDEAL DESIGN
OF
MUSIC-HALL
TO SEAT
5000 People

SECTON OF COLOSEVM.

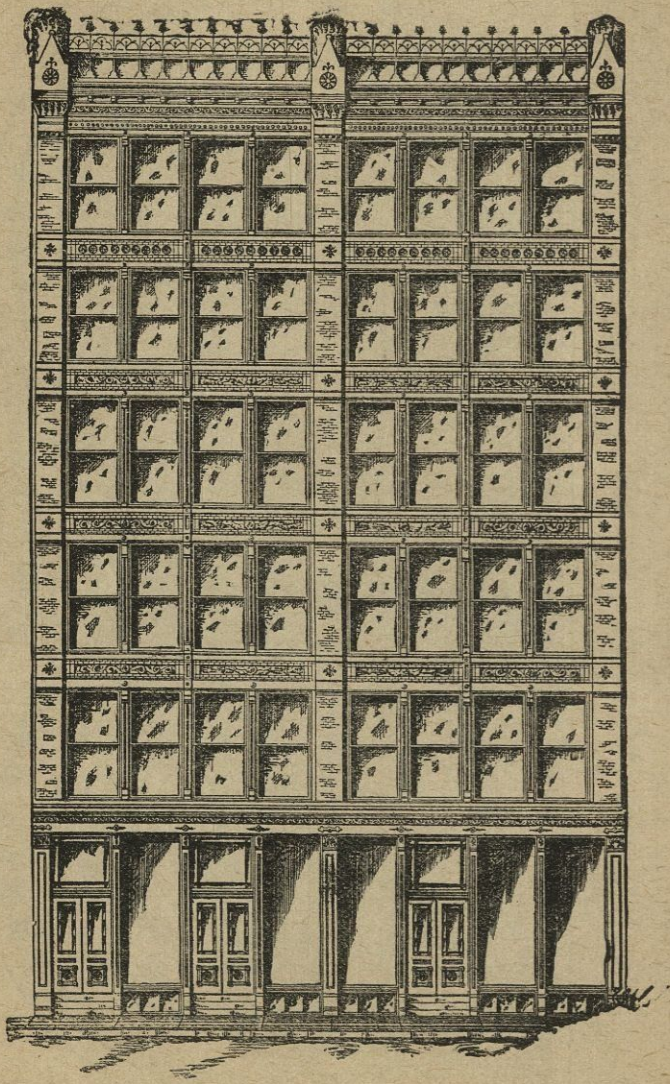
PLANS OF MUSIC HALL

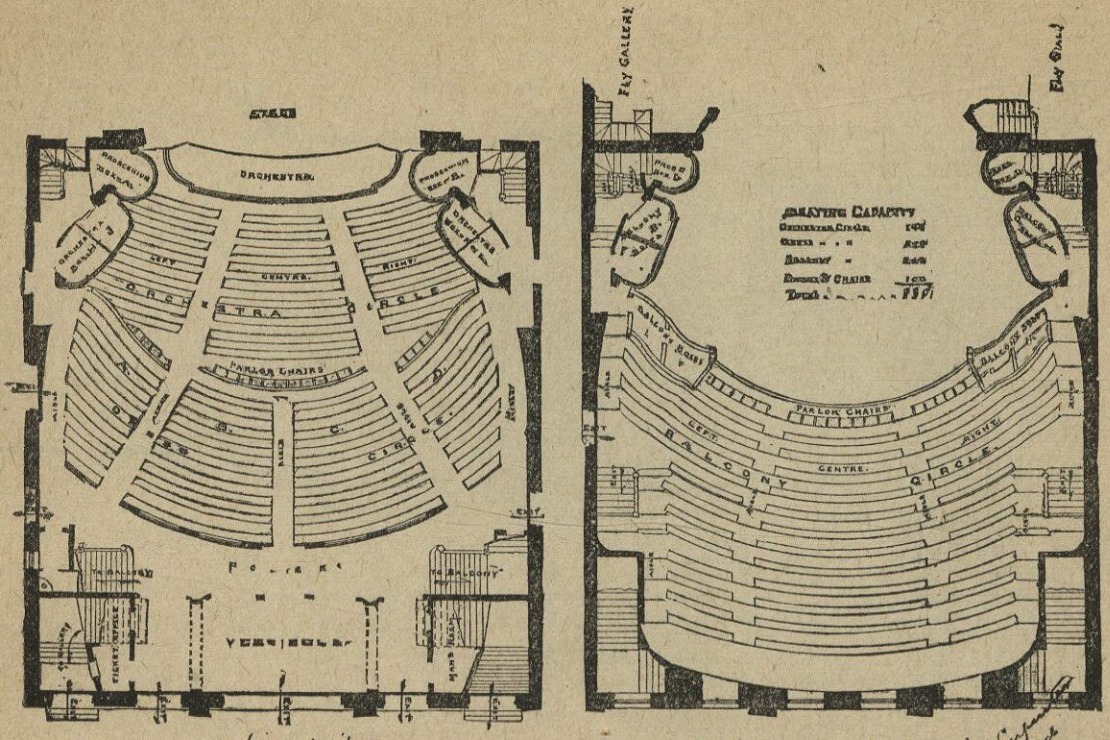


GALLERIES.

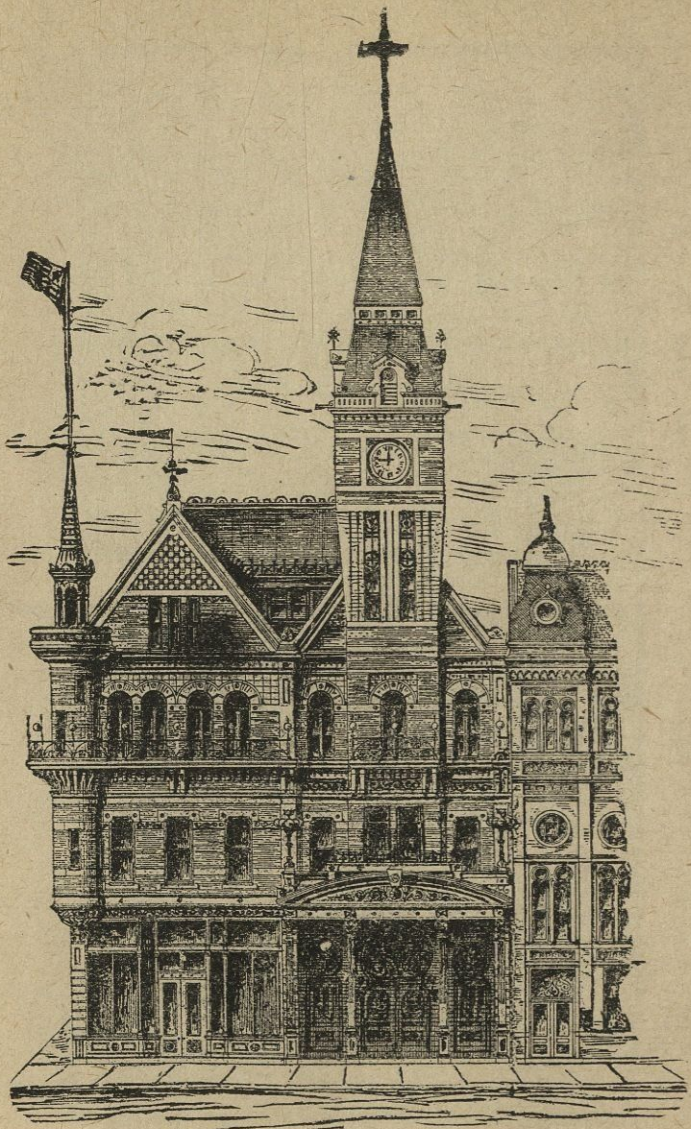


AUDITORIUM

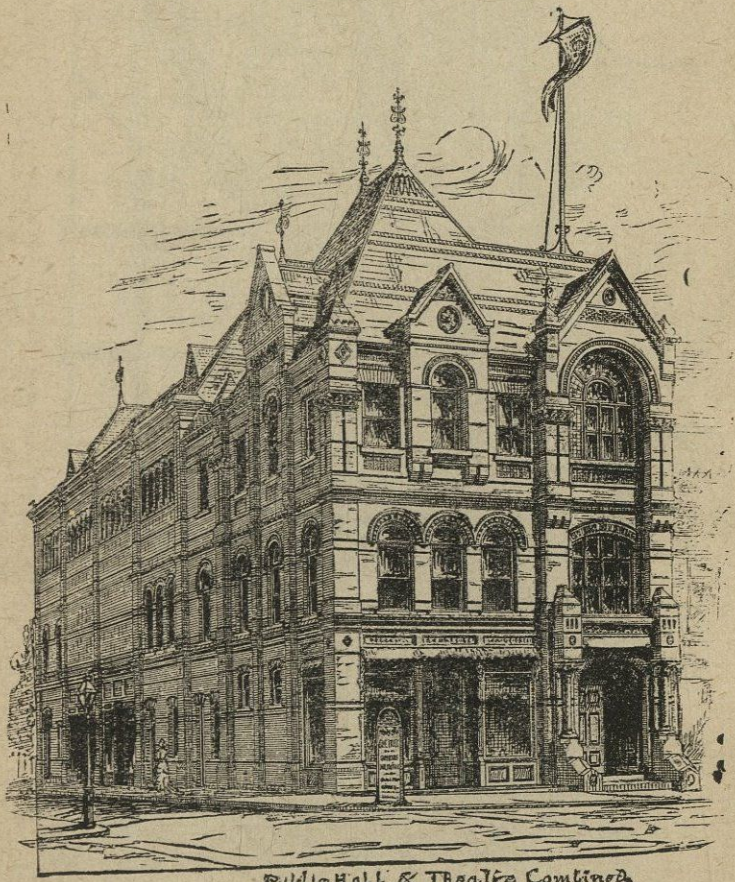




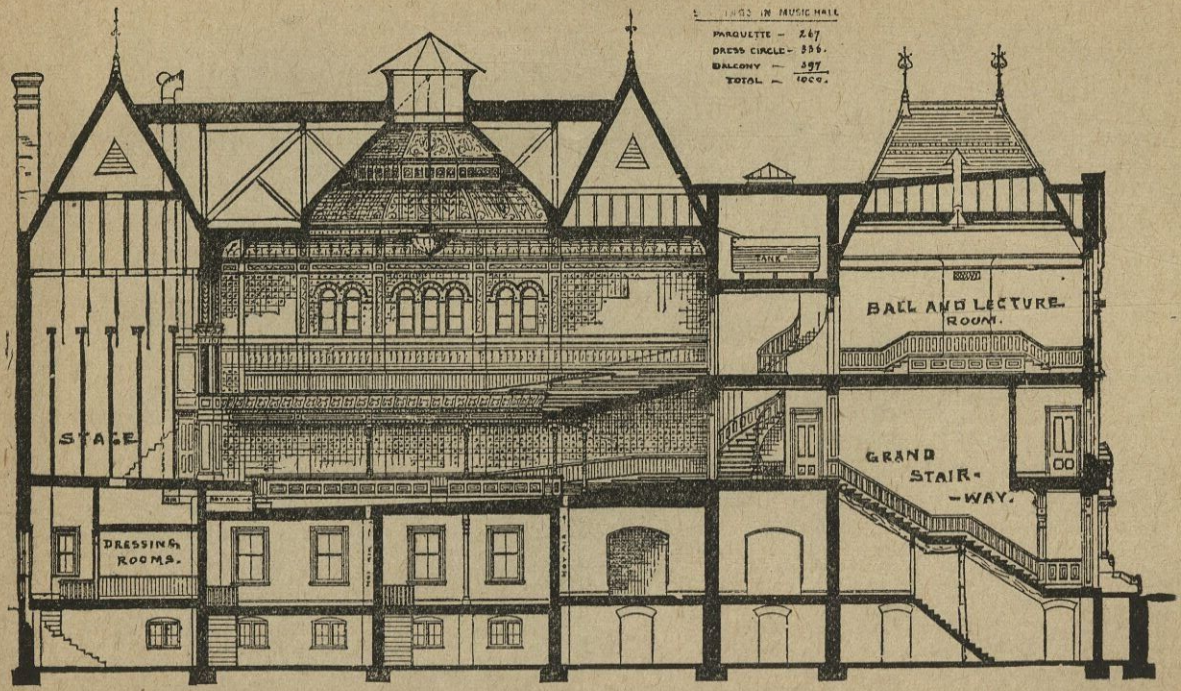
PLAN OF MAIN FLOOR NEW DESIGN FOR OPERA HOUSE. PLAN OF FIRST BALCONY



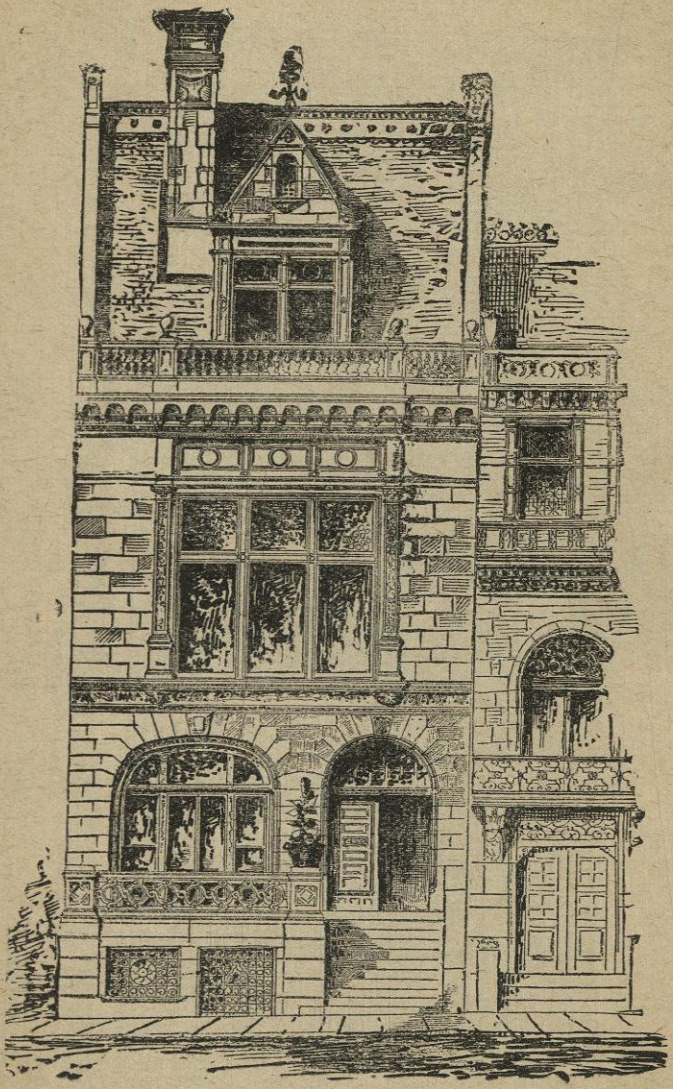
Design for a Music Hall & Store

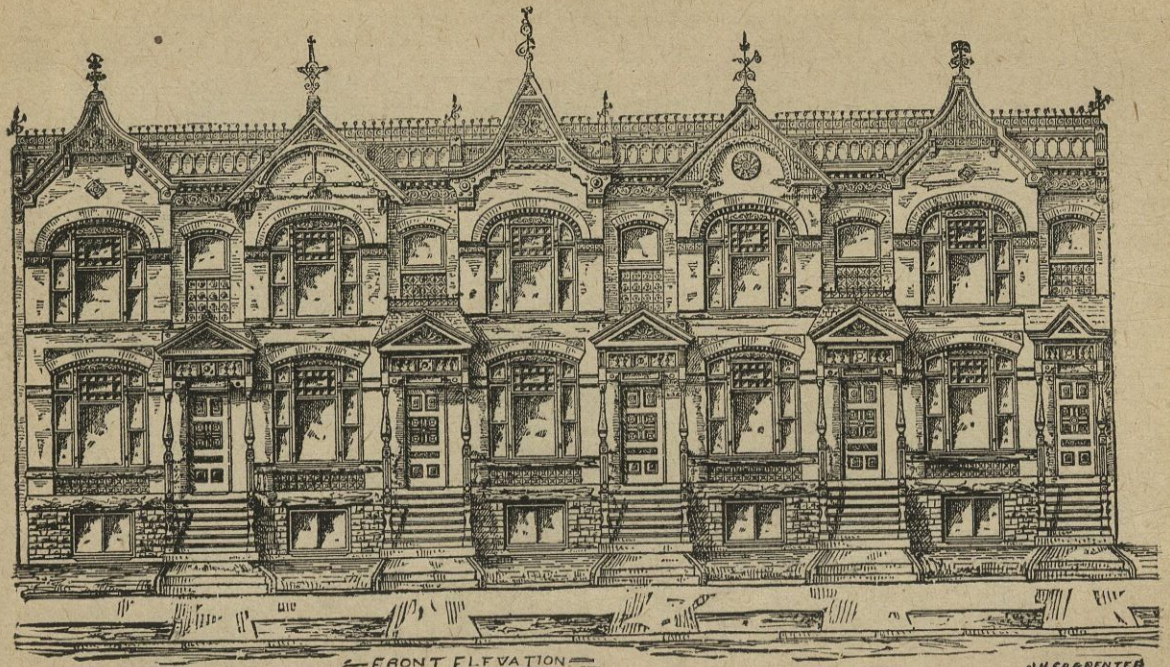


Public Hall & Theatre Combined
Built at Goshen, N.Y.



LONGITUDINAL SECTION. OF MUSIC HALL.

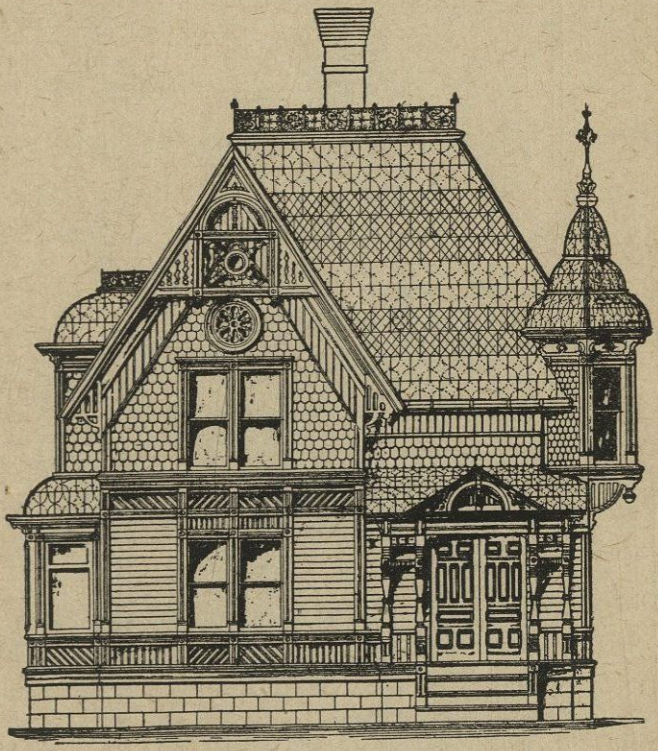




FRONT ELEVATION
of 5 Houses on Forrest Ave

SCALE ¼ INCH

J.H. CARPENTER
ARCHITECT
136 WASHINGTON ST.

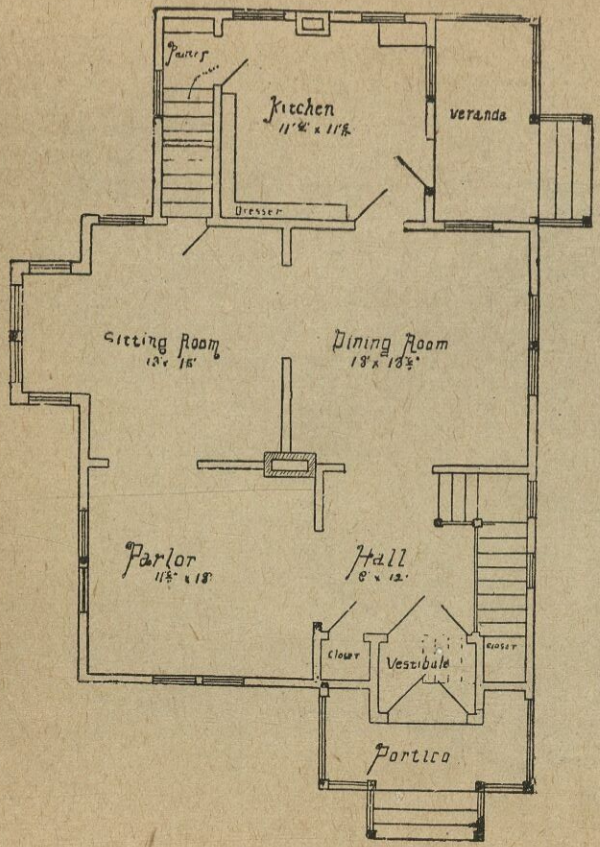


No. 17.—FRONT ELEVATION.

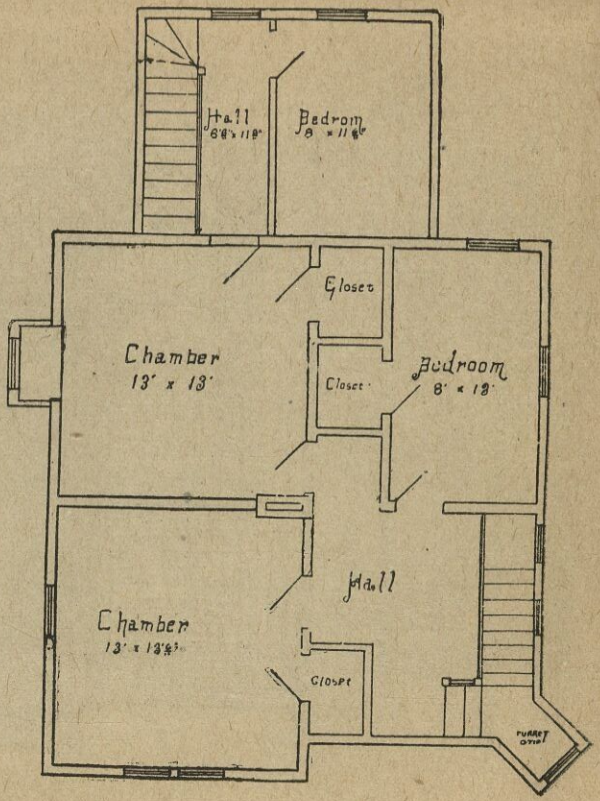
Design No. 17. A Pretty Suburban Cottage.

Cost complete, - -	$3,182.00
" without plumbing, -	2,900.00
" " foundation, -	2,450.00

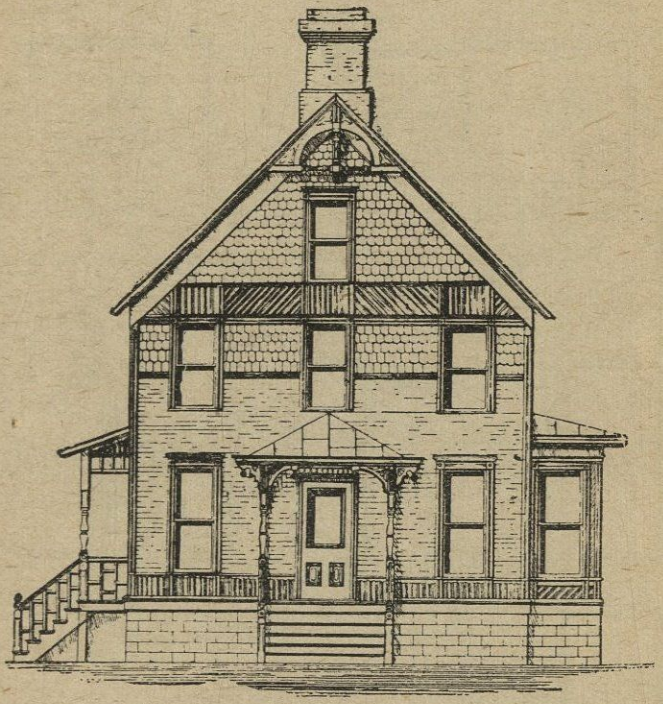
Originally designed for author's own use, and considered one of the prettiest ever constructed. A model in itself.



No. 17.—First Floor.



No. 17.—Second Floor.

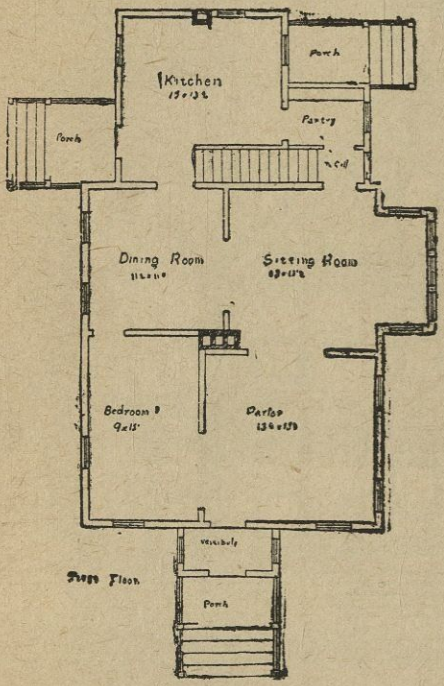


No. 18.—FRONT ELEVATION.

Design No. 18. A Country Dwelling.

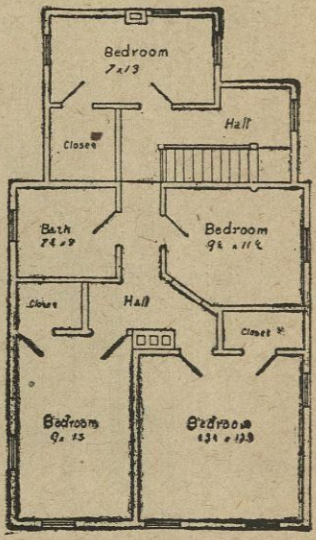
Cost complete, - - -	$2,582.00
" without plumbing, - -	2,350.00
" " " or foundation,	1,950.00

This structure is perhaps of a more economical character, so far as appearance is concerned. It has a fair size and quantity of rooms and is comfortable.



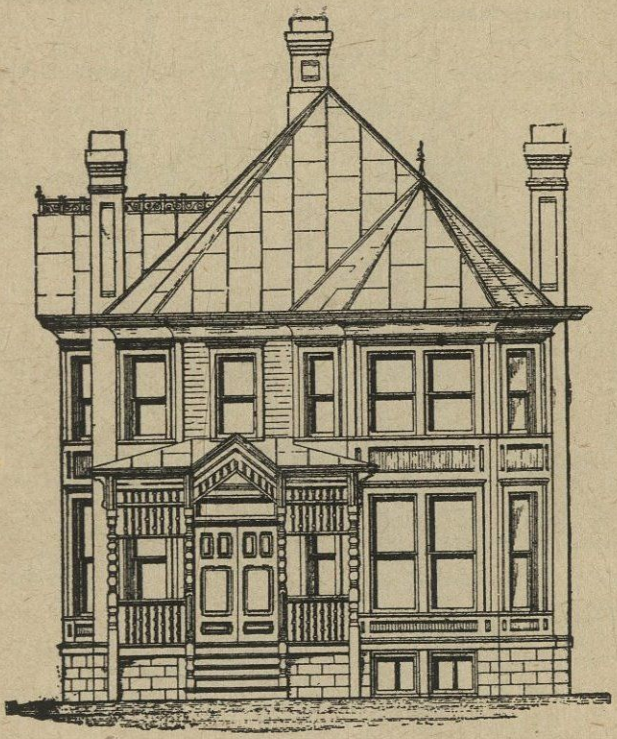
First Floor

No. 15.



Second Floor

No. 15.

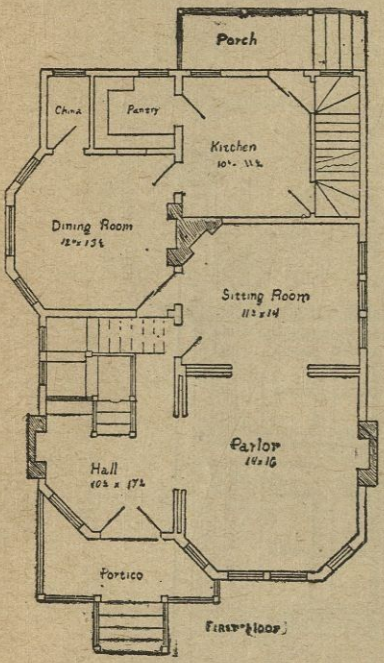


No. 19.—Front Elevation.

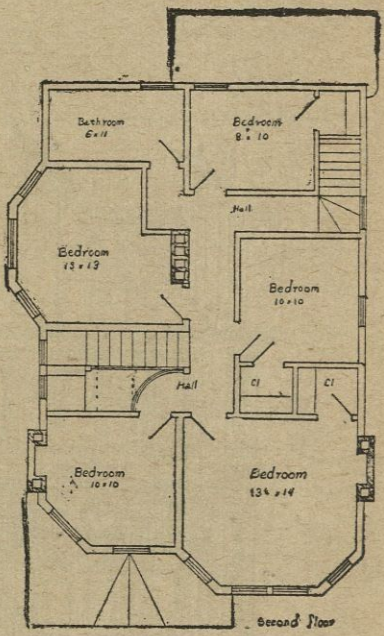
Design No. 19. A Comfortable Home.

Cost complete, - - - - - -	$3,447.00
" without plumbing, - - - -	3,275.00
" " " foundation or mantels,	2,750.00

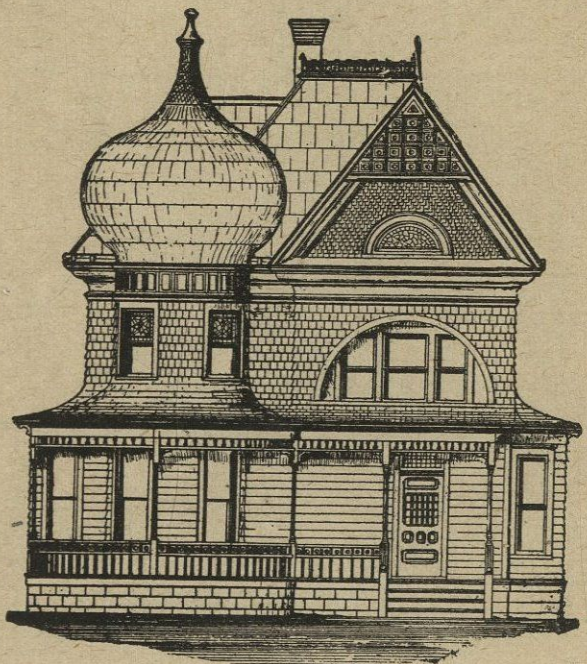
This building, while not especially ornamental, will be favorably received no doubt by those desiring a camparatively plain house.


Porch
China
Pantry
Kitchen
10'- 11½
Dining Room
12'6 x 13½
Sitting Room
11½ x 14
Parlor
14 x 16
Hall
10½ x 17½
Portico
First Floor

No. 1a.


Bathroom
6 x 11
Bedroom
8 x 10
Hall
Bedroom
13 x 13
Bedroom
10 x 10
Hall
Cl
Cl
Bedroom
10 x 10
Bedroom
13½ x 14
Second Floor

No. 1b.



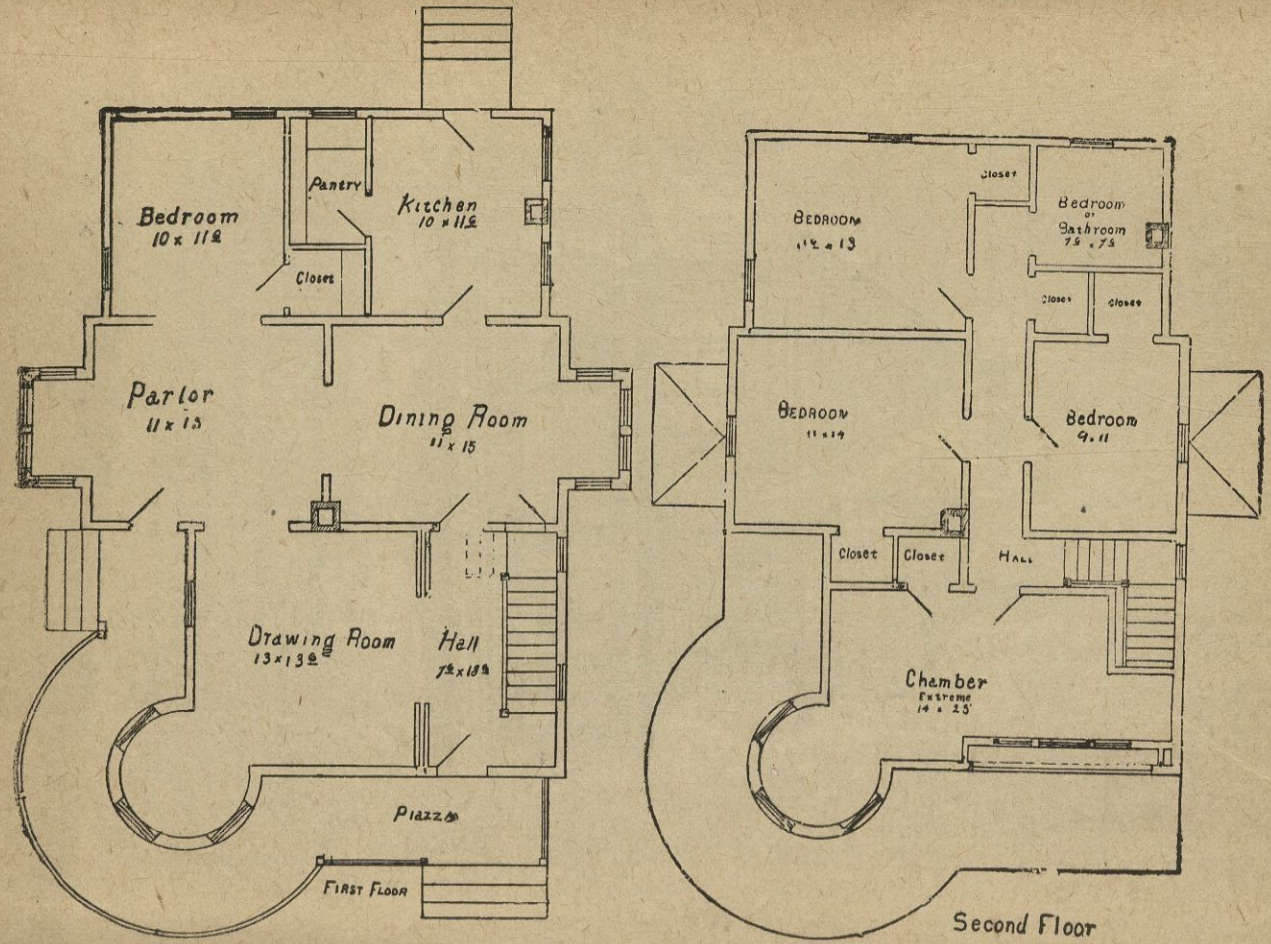
Front Elevation

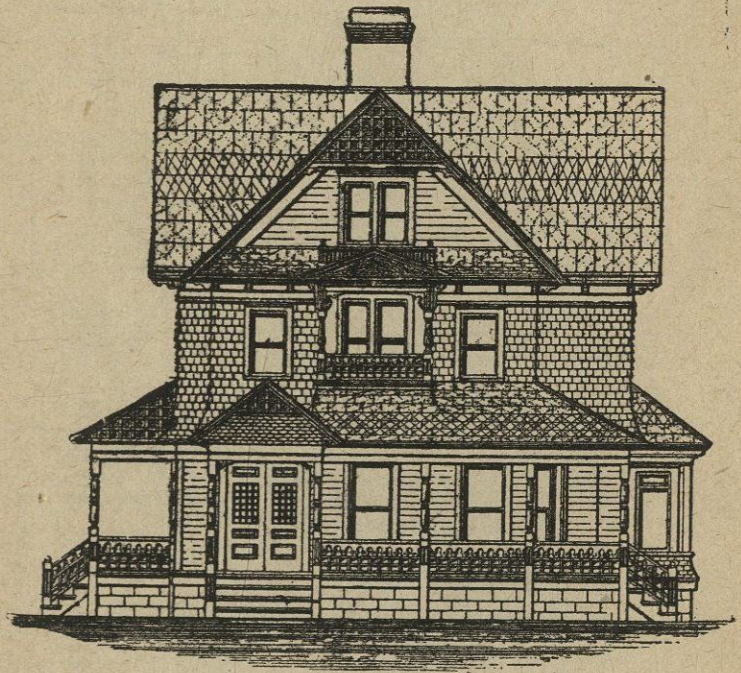
No. 20.

Design No. 20. A Unique Cottage.

Cost complete, - - - - - -	$3,450.00
" without plumbing, - - - -	3,275.00
" " " mantels or foundation,	2,740.00

Very peculiar, yet convenient and not costly, considering room and appearance. Would look handsome on a height above a lake, or in the center of a fine lawn or on a river bank.


Bedroom
10 x 11½
Pantry
Kitchen
10 x 11½
Closet
Parlor
11 x 15
Dining Room
11 x 15
Drawing Room
13 x 13½
Hall
7½ x 13½
Piazza
First Floor
Closet
Bedroom
11½ x 13
Bedroom
or
Bathroom
7½ x 7½
Closet
Closet
Bedroom
11 x 14
Bedroom
9 x 11
Closet
Closet
Hall
Chamber
Extreme
14 x 25
Second Floor



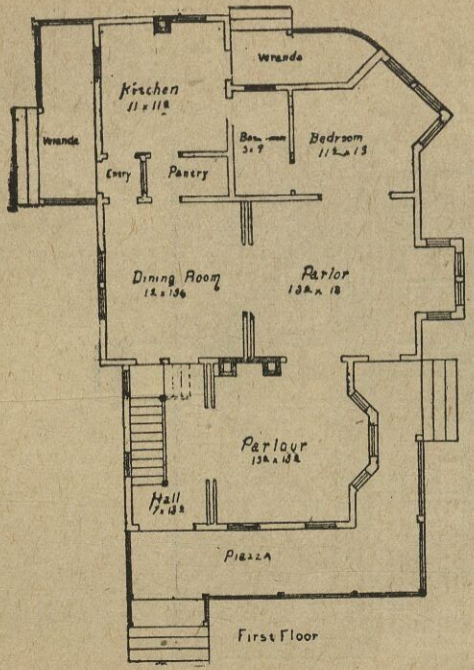
No. 21.—FRONT ELEVATION.

Design No. 21. A Modern Village Home.

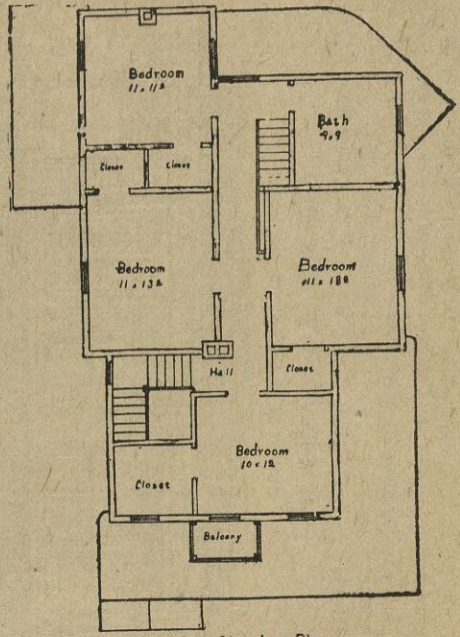
Cost complete, - - - - - - -	$3,624.00
" without plumbing, - - - - -	3,449.00
" " " foundation or mantels,	3,000.00

This fine modern dwelling is equally suitable for a farmhouse or a suburban dwelling, is roomy and comfortable.

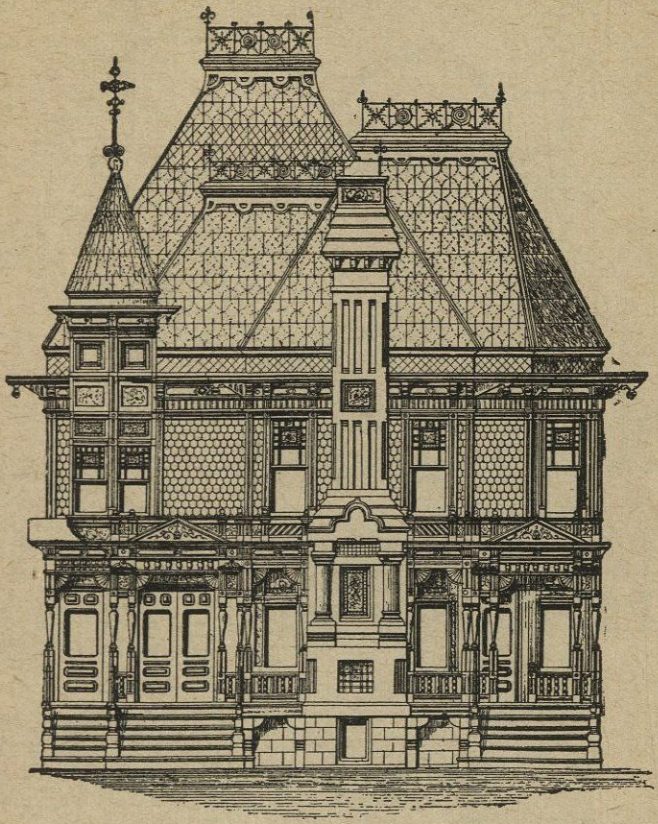
No. 20.


Veranda
Kitchen
11 x 11½
Veranda
Bedroom
11½ x 13
Entry
Pantry
Dining Room
12 x 13½
Parlor
13½ x 13
Parlour
13½ x 13½
Hall
7 x 13½
Piazza
First Floor

No. 21.


Bedroom
11 x 11½
Bath
9 x 9
Closet
Closet
Bedroom
11 x 13½
Bedroom
11 x 13½
Hall
Closet
Bedroom
10 x 12
Closet
Balcony
Chamber Plan

No. 21.

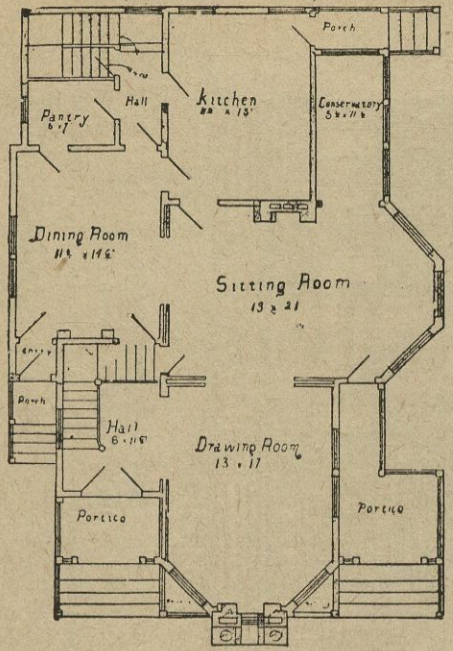


No. 22.—Front Elevation.

Design No. 22. A Modern Villa.

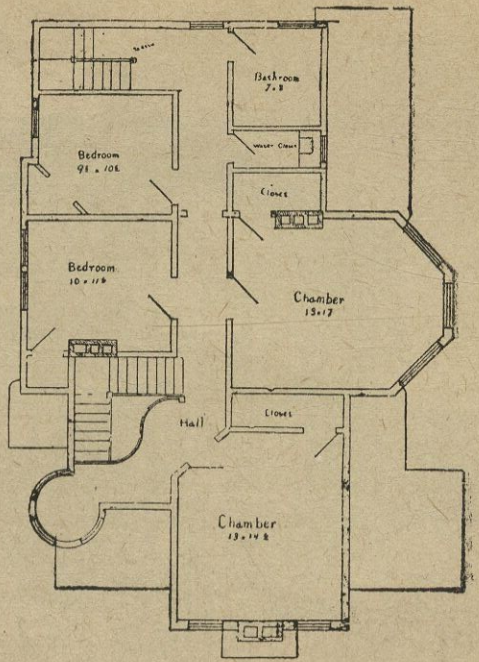
Cost complete, - - - - - - -	$4,930.00
" without plumbing, - - - - -	4,500.00
" " " foundation or mantels,	3,700.00

This more than beautiful structure is probably one of the most remarkable designs ever published. Remove all the building but the chimney and porticos, and a magnificent pavilion monument remains.



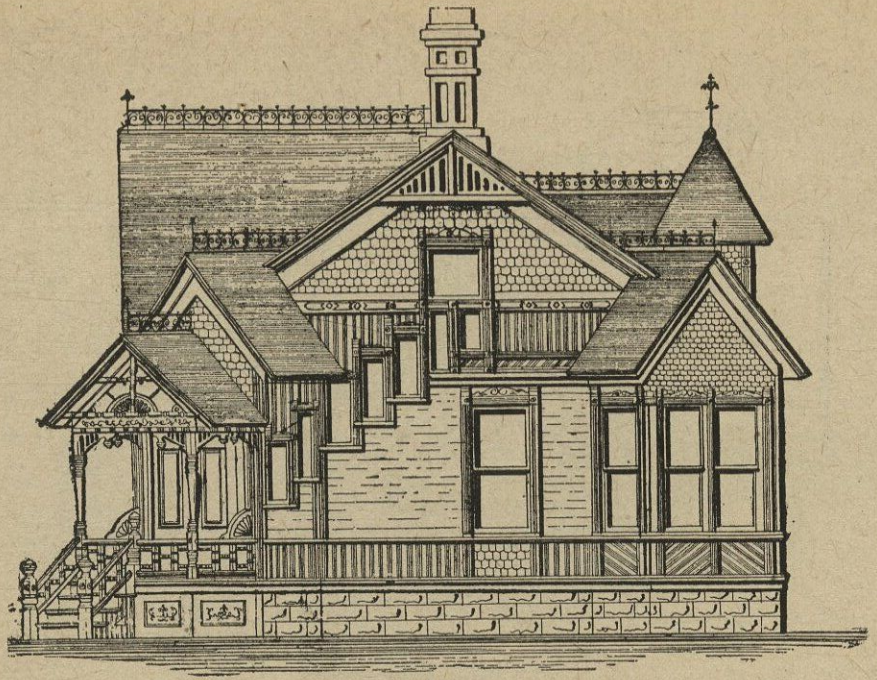
First Floor

No. 22.



Second Floor

No. 22.



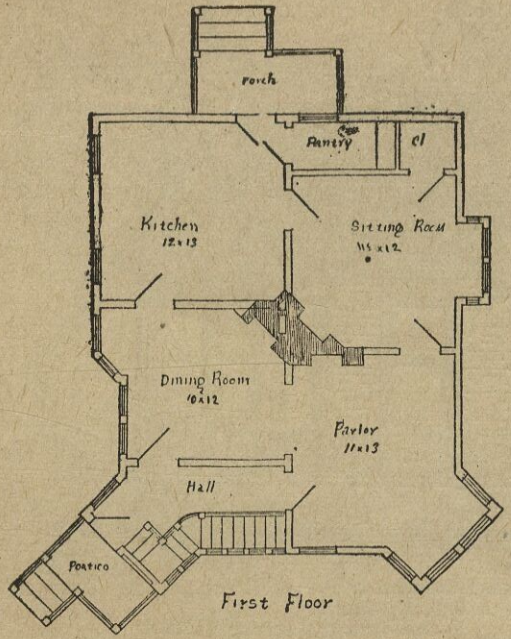
No. 23.—Front Elevation.

Design No. 23. A Unique Cottage.

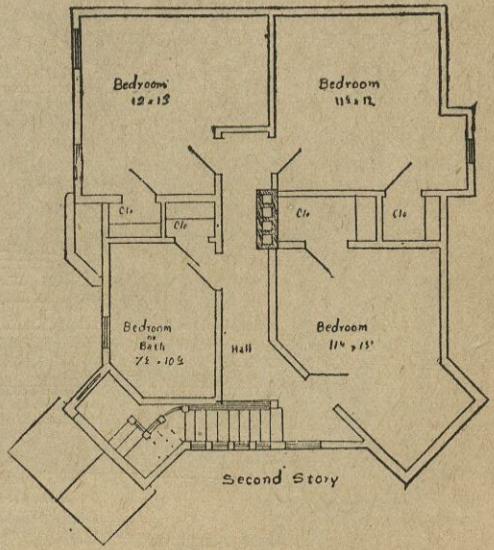
Cost complete, $2,239.00 Cost without plumbing, $1,950.00

Cost without plumbing or foundation, $1,625.00 Cost complete with mantels, $2,350.00

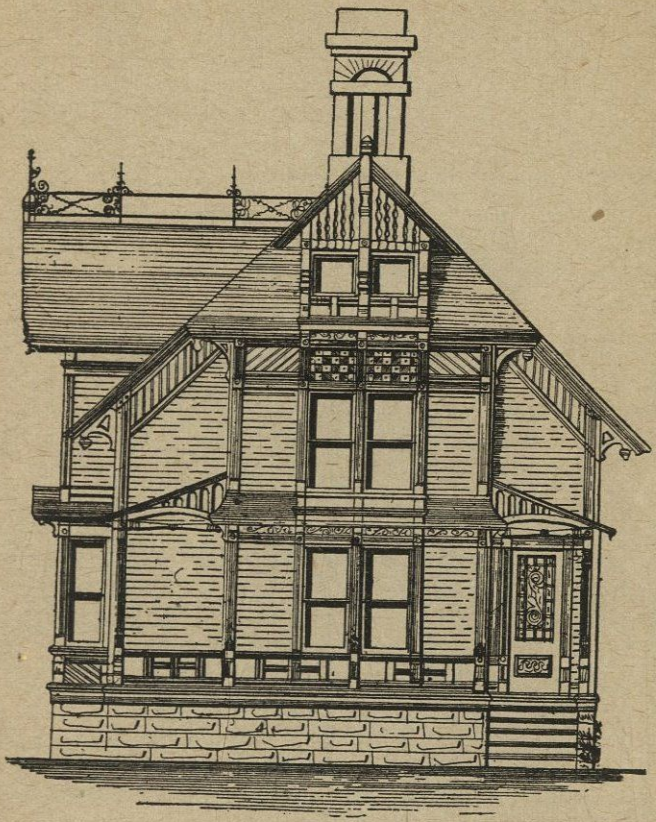
This is a decidedly peculiar and interesting Cottage, while at the same time it is handsome and comfortable, and will be undoubtedly very popular.


Porch
Pantry
Cl
Kitchen
12x13
Sitting Room
11½x12
Dining Room
10x12
Parlor
11x13
Hall
Portico
First Floor

No. 23.


Bedroom
12x13
Bedroom
11½x12
Cls
Cls
Cls
Cls
Bedroom
or
Bath
7½x10½
Hall
Bedroom
11½x13
Second Story

No. 23.

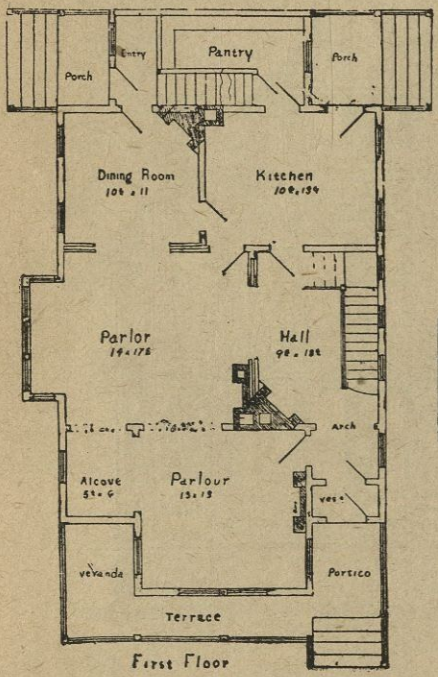


No. 24.—FRONT ELEVATION.

Design No. 24. A Convenient Residence.

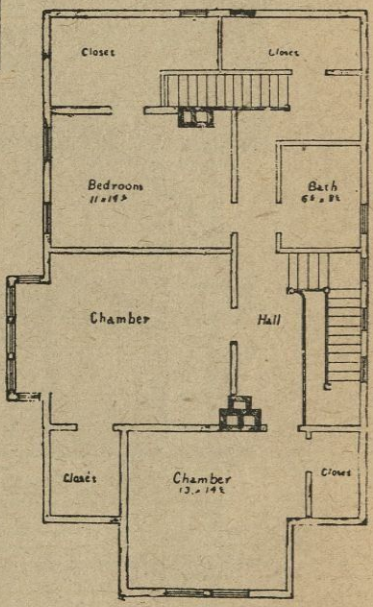
Cost complete, - - - - - - -	$3,523.00
" without plumbing, - - - - -	3,323.00
" " " foundations or mantels,	2,496.00

This design is one appropriate to a village or to the suburbs of a city, where it will appear to an advantage on a restricted section of ground.



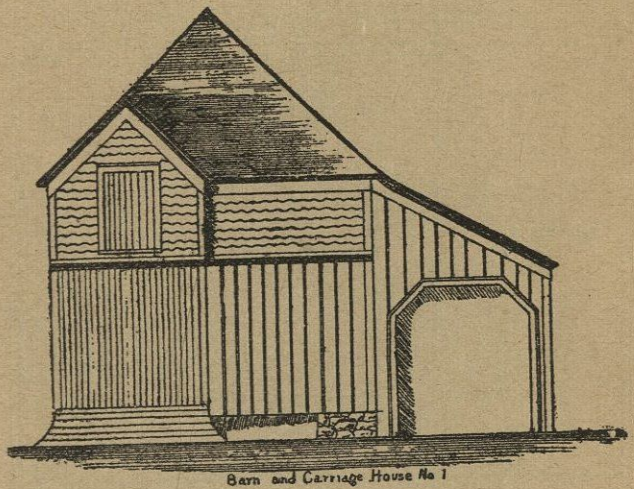
First Floor

No. 4.



Second Floor

No. 24.

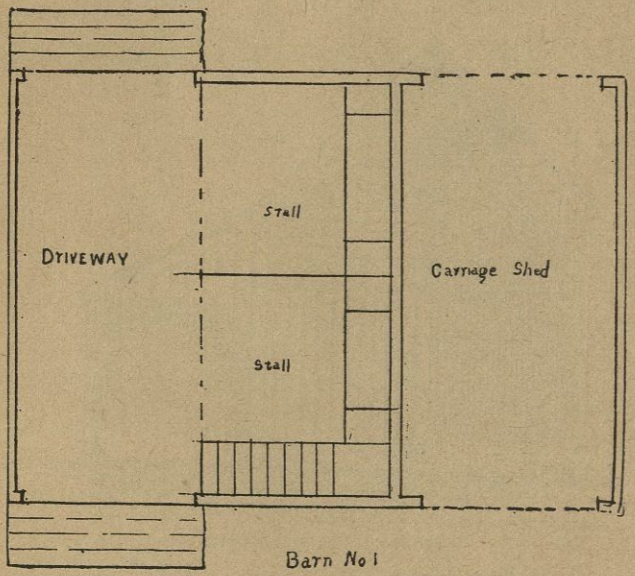


Barn and Carriage House No 1

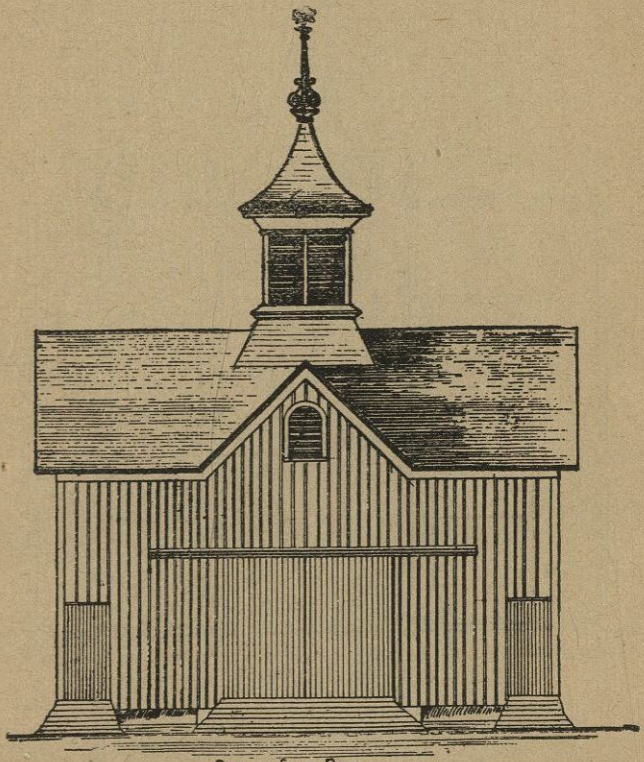
Barn No. 1. A Small Barn.

Complete cost, - - - $329.00

This barn is designed for construction on a small lot in villages, and although not expensive or particularly ornamental, is a relief from the stilted structures usually found in such places.



Barn No 1



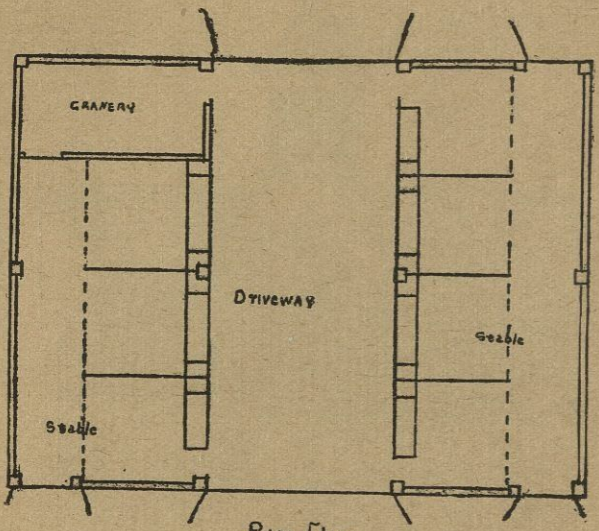
Design for a Barn

BARN NO. 2. SIDE ELEVATION.

Barn No. 2. Farm Barn.

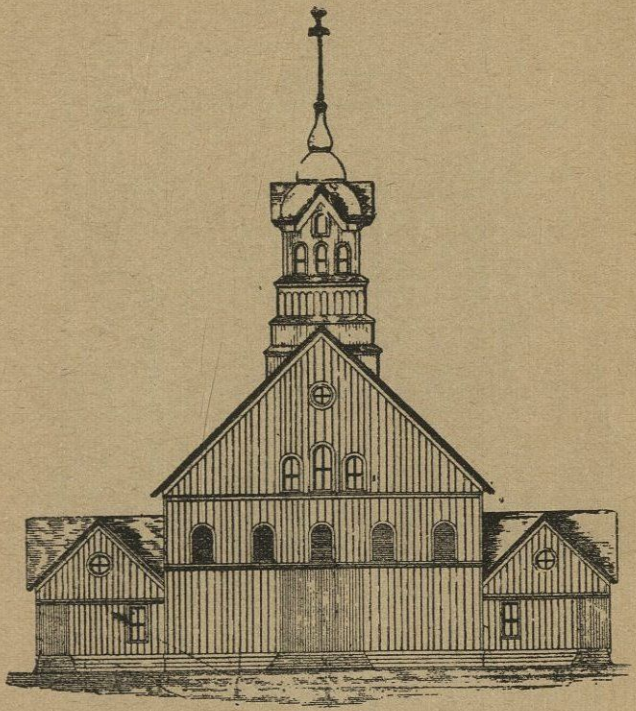
Complete cost, - - - $962.00

This barn is calculated to meet the wants and purses of the greater number of farmers throughout the country. It possesses no particular distinctive features as a design, yet is neat and substantial.



BARN FLOOR
32 · x 42

No. 2.

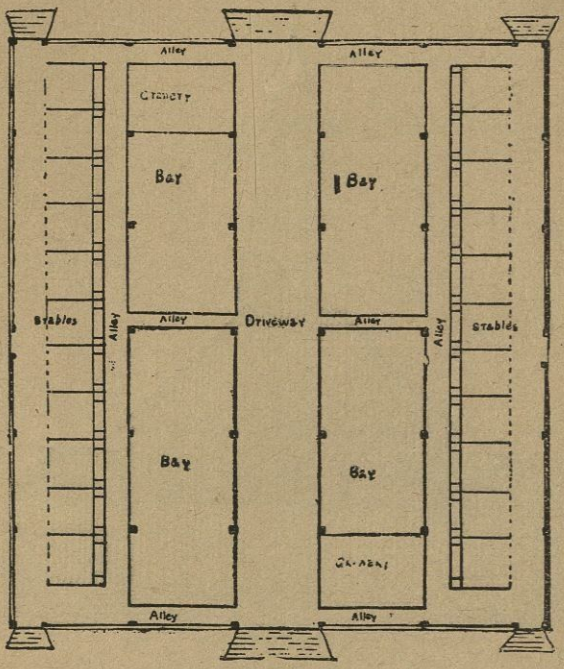


BARN No. 3. END ELEVATION.

Barn No. 3. Barn for Large Stock Farm.

Cost complete, - $4,655.00

This barn is designed for a very large stock farm, and is probably the most convenient form obtainable, is 90x100 in dimensions, covering nearly one-fourth of an acre of ground, and will hold hundreds of tons of hay.



Barn Floor Plan.
20 100
No 3.

ESTIMATE OF DESIGN No. I.

MASONRY.

16 feet Chimney, at $1.00	$16 00
180 yards Plastering at 35c	63 00
Total Masonry	$79 00

3—6 x 8—16 } SILLS.	15—2 x 8—16—JOIST.
2—6 x 8—20 }	18—2 x 4—16—COLLARS.
65—2 x 4—18—STUDS.	3—6 x 6—12—POSTS.
4—2 x 6—18 } RAFTERS.	20—2 x 4—16—ODDS.
28—2 x 4—16 }	500 feet sur. No. 2 fencing.

Total Common Lumber, 2800 feet, at $16 00 . . $44 00

8 Windows at $8.00	64 00
6 Doors at $6.00	36 00
Base, etc	8 00
Porch Materials	10 00
Cornice Materials	30 00
1200 feet, No. 1 D & M fencing, at $16 00	20 00
1000 " Siding, at 20	20 00
Total Lumber	$232 00

GENERAL ESTIMATE.

Masonry	$ 79 00
Lumber	232 00
Roofing	25 00
Hardware	25 00
Painting	30 00
Carpenter Work	75 00
No Plumbing	
Plans and Specifications	10 00
Total	$476 00

ESTIMATE OF DESIGN No. 2.

MASONRY.

No excavation	
422 Terra Cotta, or Hollow Tile Blocks at 22½c	$93 00
25 feet Chimney at 75c	19 00
500 Yards Acme Plastering at 30c	150 00
Total Masonary	$264 00

2—6 x 8—28	SILLS.	60—2 x 4—14—RAFTERS.	
3—8 x 8—20		24—2 x 4—14—COLLARS.	
100—2 x 4—12	STUDS.	25—2 x 4—16—ODDS.	
75—2 x 4—16		1044 feet surfaced No. 2.	

Total Common, 4267, at $15.00	$ 64 00
14 Windows at $10.00	140 00
15 Doors at $7.00	105 00
Base	15 00
Stairs	30 00
1500 Clear at $4.00	60 00
Porch Materials	20 00
3000 feet D & M No. 1 fencing, at $16.00	48 00
1600 " Siding, at $20.00	32 00
Total	$514 00

GENERAL ESTIMATE.

Masonry	$264 00
Lumber	514 00
Roofing	50 00
Painting	50 00
Hardware	40 00
Carpentry	150 00
No Plumbing	
Plans, Specifications and Details	20 00
Total	$1088 00

ESTIMATE OF DESIGN No. 3.

MASONRY.

36 feet Chimney at $1.00	$ 36 00
500 Yards Plastering (Acme) at 35c	175 00
Total Masonry	$211 00

7—8 x 8—20 } SILLS.	32—2 x 6—20—COLLARS.
2—8 x 8—26 }	16—2 x 8—16 } JOIST.
200—2 x 4—18—STUDS.	50—2 x 8—14 }
4—2 x 8—24 } RAFTERS.	8—8 x 8—12—POSTS.
50—2 x 4—16 }	1500 feet No. 2 sur. fencing.
25—2 x 4—16—ODDS.	

Total Common Lumber, 9181 feet, at $16.00. $146 00

14 Windows at $10.00	140 00
11 Doors at $8.00	88 00
Base, 400 feet at $5.00	20 00
Portico Materials, etc.	15 00
3000 feet No. 1 D & M fencing, at $16.00	48 00
1600 " Siding, at $20.00	32 00
Maple Flooring	10 00
Wainscoting and Ceiling	15 00
Total Lumber	$514 00

GENERAL ESTIMATE.

Masonry	$211 00
Lumber	514 00
Hardware	50 00
Painting	75 00
Carpenter Work	200 00
Plumbing	175 00
Roofing, 15 yards, at $5.00	75 00
Plans and Specifications, etc.	25 00
Total	$1325 00

ESTIMATE OF DESIGN No. 4.

MASONRY.

71 yards excavation, at 40c	$ 28 00
650 Terra Cotta, or Hollow Tile Blocks, at 22½c	146 00
18 feet Chimney at 75c	14 00
382 yards Acme Plastering at 30c	114 00
Total Masonry	$302 00

LUMBER BILL.

3—6 x 8—20 } SILLS.
2—6 x 8—24 }

30—2 x 8—12 } JOIST.
19—2 x 8—20 }

100—2 x 4—16 } STUDS.
48—2 x 4—12 }

20—2 x 4—16—COLLARS.
40—2 x 4—16—RAFTERS.
15—2 x 4—16—ODD.
900 feet surfaced No. 2 fencing.

Total Common, 4650 feet, at $16.00 ..... $ 75 00

12 Windows at $10.00	120 00
12 Doors at $7.00	84 00
Base	12 00
Stairs	15 00
Ornamental Work, Porches, etc	30 00
6000 Pattern Shingles, at $7.00	42 00
750 Siding, at $20.00	15 00
Ceiling	20 00
1000 Clear	40 00
4000 D & M No. 1 fencing	64 00
Total Lumber	$517 00

GENERAL ESTIMATE.

Masonry	$302 00
Lumber	517 00
Roofing, if Bodine, $50.00 (Tin Shingle)	80 00
Hardware	35 00
Painting	50 00
Carpentry	200 00
Plumbing	175 00
Plans, Specifications and Details	30 00
Total	$1389 00

ESTIMATE OF DESIGN No. 4½.

MASONRY.

100 yards excavation, at 35c	$ 35 00
1050 Terra Cotta, or Hollow Tile Blocks, at 22½c	235 00
56 feet Chimney, at $1.00	56 00
650 yards Acme Plastering, at 30c	195 00
Other Masonry	10 00
Total Masonry	$531 00

LUMBER BILL.

2—6 x 8—26	SILLS.	22—2 x 8—14	JOIST.
3—6 x 8—14		50—2 x 8—16	
2—6 x 8—16		12—2 x 4—14	COLLARS.
1—6 x 8—24		25—2 x 4—16	
60—2 x 4—16	STUDS.	44—2 x 4—12	RAFTERS.
50—2 x 4—20		20—2 x 4—16	
60—2 x 4—18		50—2 x 4—16	ODD.

1400 feet surfaced No. 2 fencing.

Total Common, 7133 feet, at $15.00	$107 00
20 Windows at $10.00	200 00
13 Doors at $7.00	91 00
Base	15 00
Stairs	15 00
Clear Lumber, 1500 feet, at 40c	60 00
Porch Materials	25 00
4500 feet D. & M. No. 1 fencing, at $16.00	72 00
2500 " Siding, at $20.00	50 00
500 " Ceiling, at $30.00	15 00
Maple Flooring	15 00
Other Lumber	75 00
Total Lumber	$740 00

GENERAL ESTIMATE.

Masonry	$531 00
Lumber	740 00
14 Sq. Roofing (Tin Shingle at $9.00)	126 00
Hardware	50 00
Painting	90 00
Nc Plumbing	
Carpentry	300 00
Plans, Specifications and Details	30 00
Total	**$1867 00**

ESTIMATE OF DESIGN No. 5.

MASONRY.

60 yards of excavation, at 35c	$ 21 00
725 Terra Cotta, or Hollow Tile Blocks, at 22½c	163 00
40 feet Chimney, at 75c	30 00
500 yards Acme Plastering, at 30c	150 00
Total Masonry	$364 00

LUMBER BILL.

1—6 x 8—36	SILLS.	20—2 x 4—16	COLLARS.
2—6 x 8—12		5—2 x 4—20	
3—6 x 8—16		150—2 x 4—18	STUDS.
1—6 x 8—24		50—2 x 4—12	
6—2 x 6—12	JOIST.	30—2 x 4—16	
32—2 x 8—12		38—2 x 4—12—RAFTERS.	
20—2 x 8—16		1000 surfaced No. 2 fencing.	

Total Common Lumber, 6000 feet, at $15.00. $ 90 00

19 Windows at $10.00	190 00
16 Doors at $7.00	112 00
Base	15 00
Stairs	15 00
4500 feet D. & M. No. 1 fencing, at $16.00	72 00
2500 " Siding, at $20.00	50 00
2000 Pattern Shingles, at $7.00	14 00
2000 Clear Lumber	80 00
Turned Work and Scrolls	25 00
Other Lumber	40 00
Total Lumber	$703 00

GENERAL ESTIMATE.

Masonry	$364 00
Lumber	703 00
Carpentry	200 00
Hardware	40 00
Painting	100 00
Roofing, Bodine, 10 Sq. at $5.00	50 00
Plumbing	175 00
Plans, Specifications and Details	35 00
Total	$1667 00

ESTIMATE OF DESIGN No. 6.

MASONRY.

100 yards of excavation, at 35c	$ 35 00
1000 Terra Cotta, or Hollow Tile Blocks, at 22½c	225 00
34 feet Chimney, at $1.25	43 00
600 yards Plastering (Acme) at 30c	180 00
Total Masonry	$483 00

LUMBER BILL.

130—2 x 4—14	38—2 x 8—14
70—2 x 4—16	38—2 x 8—12
5—6 x 8—26	60—2 x 4—18
1—6 x 8—88	1300 feet surfaced No. 2 fencing.

Total, 7000 Common, at $15.00 ..... $105 00

15 Doors at $7.00	105 00
18 Windows at $10.00	180 00
Mouldings and Base	25 00
Porch Material	25 00
Cornice Material	36 00
Band Course	12 00
Brackets	15 00
Stairs	75 00
1400 feet Siding, at 20c	28 00
3700 " D. & M. No. 1 fencing, at $16.00	59 00
Maple Flooring	10 00
Wainscoting and Ceiling	10 00
Other Lumber	30 00
Total Lumber	$715 00

GENERAL ESTIMATE.

Masonry	$483 00
Lumber	715 00
Roofing, 132 Bodine	65 00
Hardware	50 00
Painting and Oil finish	125 00
Carpentry	300 00
Plumbing	175 00
Plans, Specifications and details	40 00
Total	$1953 00

ESTIMATE OF DESIGN No. 7.

MASONRY.

88 yards of excavation, at 35c	$ 30 00
1300 Terra Cotta, or Hollow Tile Blocks, at 22½c	292 00
3 Fireplaces, at $5.00	15 00
36 feet Chimney, at $1.25	45 00
18 " " " 75c	13 00
550 yards Acme Plastering, at 30c	165 00
Total Masonry	$560 00

LUMBER BILL.

178—2 x 4—18—STUDS.		22—2 x 8—14	JOIST.
2—6 x 8—24	SILLS.	4—2 x 8—16	JOIST.
1—6 x 8—20	SILLS.	54—2 x 8—12	JOIST.
3—6 x 8—14	SILLS.	60—2 x 4—12—STUDS.	
1—6 x 8—18	SILLS.	20—2 x 4—20	RAFTERS.
1—6 x 8—12	SILLS.	28—2 x 4—14	RAFTERS.
1—6 x 8—24 to cut	SILLS.	14—2 x 4—12	RAFTERS.
1—6 x 8—16	SILLS.	20—2 x 4—16	RAFTERS.

2000 feet surfaced, 6-in. No. 2 Common

Total Common, 8400 feet, at $15.00 ..... $126 00

2500 Pattern Shingles, at $7.00	18 00
1800 feet Siding, at $20.00	36 00
4900 " No. 1 matched and sur. fencing, at $16.00	80 00
19 Windows at $10.00	190 00
9 Doors at $7.00	63 00
Base, etc	15 00
Porch, Columns and Turned Work, etc	40 00
Stairs	50 00
Steps and Porch finish	30 00
Cornice	30 00
Total Lumber Bill	$678 00

GENERAL SUMMARY.

Masonry	$560 00
Lumber	678 00
20 squares Roofing, at $9 00 (if Bodine $90.00)	180 00
Carpenter Work not included with Lumber	300 00
Hardware	75 00
Painting and Oil Finishing	125 00
Mantels and Setting	90 00
Plumbing	175 00
Plans, Specifications and Details	40 00
Total	$2223 00

ESTIMATE OF DESIGN No. 8.

MASONRY.

Excavation	$ 30 00
1436 Terra Cotta, or Hollow Tile Blocks, at 22½c	323 00
56 feet Chimney, at $1.00	56 00
2 Mantels at $30.00	60 00
2 Fireplaces	10 00
777 yards Acme Plastering, at 30c	233 00
Other Masonry	20 00
Total Masonry	$732 00

LUMBER BILL.

2—6 x 8—28	SILLS.	230—2 x 4—18	STUDS.
3—6 x 8—10		40—2 x 4—12	
2—6 x 8—26		22—2 x 4—14	COLLARS.
2—6 x 8—22		17—2 x 4—12	
1—6 x 8—16		20—2 x 8—10	
44—2 x 8—14	JOISTS.	8—2 x 4—16	
34—2 x 8—12		28—2 x 4—14	RAFTERS.
40—2 x 8—10		20—2 x 4—14	
8—2 x 6—16		25—2 x 4—16	

1600 feet sur. 6-in. No. 2, Common Boards	
Total, 8800 feet, Common, at $15.00	$132 00
17 Windows at $10.00	170 00
14 Doors at $7.00	98 00
1 Sliding Door	20 00
Stairs	60 00
Base	25 00
Clear Lumber, 2000 feet	80 00
9000 Pattern Shingles, at $6.00	54 00
1700 Siding, at $20.00	34 00
6000 D. & M. No. 1 fencing, at $16.00	96 00
Other Lumber	75 00
Total Lumber	$844 00

GENERAL SUMMARY.

Masonry	$732 00
Lumber	844 00
16 squares Roofing, at $8.00	128 00
Carpentry, not above included	250 00
Hardware	60 00
Painting	125 00
Plumbing	175 00
Plans, Specifications and Details	45 00
Total	$2359 00

ESTIMATE OF DESIGN No. 9.

MASONRY.

138 yards excavation, at 35c	$ 48 00
1300 Terra Cotta, or Hollow Tile Blocks, at 22½c	292 00
1 Fireplace	5 00
1 Mantel	30 00
38 feet Chimney, at $1.25	45 00
785 yards Acme Plastering, at 30c	220 00
Other Masonry	15 00
Total Masonry	$655 00

LUMBER BILL.

SILLS.

2—6 x 8—28	72—2 x 8—14
1—6 x 8—36	60—2 x 8—12
1—6 x 8—16	260—2 x 4—18
3—6 x 8—14	36—2 x 4—14
2—6 x 8—12	30—2 x 4—12
36—2 x 4—14	14—2 x 6—20

1900 feet, Surfaced Common, No. 2.....

Total Common, 9876 feet, at $15.00 ..... $148 00

30 Windows at $10.00	300 00
20 Doors at $7.00	140 00
Finishing Materials	125 00
Pattern Shingles	50 00
2000 Siding at $20.00	40 00
6300 D. & M. No. 1 Fencing, at $16.00	100 00
Stairs	50 00
Other Lumber	50 00
Total Lumber	$1003 00

GENERAL ESTIMATE.

Masonry	$ 655 00
Lumber	1003 00
Carpentry	300 00
Roofing	90 00
Hardware	60 00
Painting	125 00
Plumbing	175 00
Plans, Specifications and Details	48 00
Total	$2456 00

ESTIMATE OF DESIGN No. 10.

MASONRY.

150 yards of excavation, at 35c	$ 50 00
1600 Hollow Terra Cotta Blocks, at 25c	400 00
1 Mantle	30 00
1 Fireplace	10 00
Chimneys	80 00
800 yards Acme Plastering, at 35c	280 00
Other Masonry	25 00
Total Masonry	$875 00

LUMBER BILL.

2—6 x 8—28	SILLS.	30—2 x 6—20	RAFTERS AND ODDS.
1—6 x 8—24		30—2 x 4—12	
2—6 x 8—20		38—2 x 4—16	
5—6 x 8—14		1—4 x 6—16	P SILLS.
1—6 x 8—18		1—4 x 6—18	
2—6 x 8—16		1—6 x 6—12	POSTS.
6—2 x 8—16-CEL. STAIRS.		3—6 x 6—14	
14—2 x 6—30	COLLAR BEAMS.	86—2 x 8—14	JOIST.
2—2 x 6—28		20—2 x 8—18	
6—2 x 6—24		5—2 x 6—14	
12—2 x 8—16		4—2 x 6—12	
200—2 x 4—18	STUDS.	2800 feet 6-in. Surfaced No. 2 Common.	
40—2 x 4—16			

Total 11274 ft. Common Lumber, at $16.00	$180 00
4400 feet Siding, at $20.00	88 00
6000 No. 1 D. & M. fencing, at $16.00	96 00
300 feet Maple Flooring	12 00
800 " Reeded Ceiling, at $30.00	24 00
1500 " Clear, at $40.00	60 00
400 " Southern Pine Clear	16 00
35 Windows at $10.00	350 00
27 Doors at $7.00	189 00
Portico Material and Turned Work	45 00
Stairs	35 00
Base, etc	40 00
Total Lumber	$1135 00

GENERAL ESTIMATE.

Masonry	$ 875 00
Lumber	1135 00
Carpentry	600 00
Plumbing	200 00
Roofing	140 00
Hardware	80 00
Painting	175 00
Plans, Specifications, etc	65 00
Total	**$3270 00**

ESTIMATE OF DESIGN No. 11.

MASONRY.

120 yards excavation, at 35c	$ 42 00
Fireplace	5 00
Mantle	30 00
1000 Terra Cotta, or Hollow Tile Blocks, at 22½c	225 00
44 feet Chimney, at $1.25	55 00
700 yards Plastering (Acme) at 30c	210 00
Total Masonry	$567 00

2—8 x 8—28	SILLS.	56—2 x 8—14	JOIST.
2—8 x 8—22		24—2 x 8—12	
2—8 x 8—36		28—2 x 8—16	
12—2 x 4—12	COLLARS.	250—2 x 4—18	STUDS.
12—2 x 4—14		100—2 x 4—16	
17—2 x 4—22		30—2 x 4—16—PLATES.	
38—2 x 6—24	RAFTERS.	2300 feet surfaced, No. 2 fencing.	
15—2 x 4—14			

10861 ft. Total Common Lumber, at $15.00	$ 163 00
20 Windows at $10.00	200 00
16 Doors at $7.00	112 00
Base	25 00
5500 D. & M. No. 1 fencing, at $16.00	88 00
1250 Siding, at $20.00	25 00
700 feet Wainscoting, at $30.00	21 00
Maple Flooring	10 00
Cornice Materials	90 00
Portico Materials	15 00
7000 Pattern Shingles, at $7.00	49 00
Stairs	60 00
Other Lumber	50 00
Total Lumber	$908 00

GENERAL ESTIMATE.

Masonry	$567 00
Lumber	908 00
Carpentry	500 00
Plumbing	175 00
Hardware	75 00
Painting	150 00
Roofing 23 yards, at $8.00	185 00
Plans, Specifications and Details	45 00
Total	$2605 00

ESTIMATE OF DESIGN No. 12.

MASONRY.

140 yards excavation, at 35c.	$ 50 00
1600 Terra Cotta, or Hollow Tile Blocks, at 22½c.	360 00
2 Fireplaces at $5.00	10 00
2 Mantels at $30.00	60 00
56 feet Chimney, at $1.00	56 00
850 yards Acme Plastering, at 30c.	255 00
Total Masonry	$791 00

LUMBER BILL.

1—6 x 8—42	38—2 x 6—18
3—6 x 8—24	14—2 x 4—14 } RAFTERS.
2—6 x 8—22 } SILLS.	10—2 x 4—16
1—6 x 8—20	100—2 x 4—16—ODDS.
1—6 x 8—12	225—2 x 4—18
134—2 x 8—12—JOIST.	40—2 x 4—16 } STUDS.
66—2 x 4—12—COLLARS.	40—2 x 4—16—PLATES.

1440 feet surfaced No. 2 fencing

Total Common 11224 feet, at $15.00 $168 00

32 Windows at $10.00	320 00
20 Doors at $7.00	140 00
Portico Material	20 00
1 Set Sliding Doors	20 00
Stairs	40 00
5800 feet D. & M. No. 1 fencing, at $16.00	92 00
3360 " Siding at $20.00	67 00
2000 4th Clear	80 00
4000 Pattern Shingles, at $6.00	24 00
Other Lumber	50 00
Total Lumber	$1021 00

GENERAL ESTIMATE.

Masonry	$ 791 00
Lumber	1021 00
Roofing 18 squares at $8.00	120 00
Carpentry	350 00
Painting and Oil Finish	150 00
Plumbing	175 00
Hardware	75 00
Plans, Specifications and Details	52 00
Total	$2734 00

ESTIMATE OF DESIGN No. 13.

MASONRY.

Excavation	$ 30 00
1300 Terra Cotta, or Hollow Tile Blocks, at 22½c	292 00
32 feet Chimney, at $1.25	40 00
18 " " " 75c	14 00
2 Mantels at $30.00	60 00
2 Fireplaces	10 00
885 Acme Plastering, at 30c	265 00
Other Masonry	20 00
Total Masonry	$731 00

LUMBER BILL.

2—6 x 8—26	SILLS.	26—2 x 8—14	JOIST.
2—6 x 8—14		40—2 x 8—16	
2—6 x 8—16		32—2 x 8—12	
1—6 x 8—12		13—2 x 4—14	COLLARS.
1—6 x 8—28		20—2 x 4—16	
1—6 x 8—20		16—2 x 4—12	
2—4 x 6—12		20—2 x 4—14	RAFTERS.
228—2 x 4—20	STUDS.	30—2 x 4—16	
60—2 x 4—12		30—2 x 4—18	
30—2 x 4—16		2000 6-in. No. 2 Common sur.	

Total Common, 10000 feet, at $15.00	$150 00
18000 Pattern Shingles, at $5.00	90 00
1800 feet Siding, at $20.00	36 00
6000 D. & M. No. 1 fencing, at $16.00	96 00
Base	25 00
32 Windows at $10.00	320 00
20 Doors at $7.00	140 00
Stairs	60 00
Steps and Porches	40 00
Clear, 2000	80 00
Turned Work	20 00
Other Mill Work	25 00
Total Lumber	$1082 00

GENERAL ESTIMATE.

Masonry	$ 731 00
Lumber	1082 00
Roofing	160 00
Carpentry	400 00
Hardware	80 00
Painting and Oil Finishing	175 00
Plumbing	175 00
Plans, Specifications and Details	50 00
Total	$2853 00

ESTIMATE OF DESIGN No. 14.

MASONRY.

150 yards of Excavation, at 35c	$ 52 00
1600 Terra Cotta, or Hollow Tile Blocks, at 22½c	360 00
3 Fireplaces	15 00
3 Mantels at $30.00	90 00
38 feet Chimney at $1.25	47 00
26 " " " 75c	19 00
900 yards Acme Plastering, at 30c	270 00
Other Masonry	25 00
Total Masonry	$878 00

LUMBER BILL.

2—6 x 8—26	SILLS.	18—2 x 4—14	COLLARS.
1—6 x 8—24		44—2 x 4—12	
1—6 x 8—14		30—2 x 4—16	PLATES.
3—6 x 8—12		25—2 x 4—16	ODD.
2—6 x 8—28		52—2 x 4—18	RAFTERS.
36—2 x 8—14	JOIST.	14—2 x 4—14	
88—2 x 8—12		20—2 x 4—16	
20—2 x 6—12		2000 feet surfaced, 6 in. No. 2 fencing.	
272—2 x 4—20	STUDS.		
60—2 x 4—16			

Total Common, 11800 feet at $15.00	$177 00
26 Windows at $10.00	260 00
18 Doors at $7.00	126 00
2000 Clear, at $40.00	80 00
Base	25 00
6200 D. & M. No. 1 fencing, at $16.00	99 00
3700 feet Siding, at $20.00	74 00
Wainscoting	10 00
Maple Flooring	10 00
Porch Work	40 00
Mouldings	20 00
Stairs	60 00
Other Lumber	40 00
Total Lumber	$1021 00

GENERAL ESTIMATE.

Roofing	$ 160 00
Lumber	1021 00
Masonry	878 00
Carpentry	450 00
Painting and Oil Finish	175 00
Hardware	80 00
Plumbing	175 00
Plans, Specifications and Details	60 00
Total	$2999 00

ESTIMATE OF DESIGN No. 16.

MASONRY.

170 yards Excavation, at 35c	$ 60 00
1550 Terra Cotta, or Hollow Tile Blocks, at 22½c	350 00
2 Fireplaces	10 00
2 Mantels at $30.00	60 00
111 feet Chimney, at 75c	84 00
735 Acme Plastering, at 30c	220 00
Other Masonry	20 00
Total Masonry	$804 00

LUMBER BILL.

4—6 x 8—16	SILLS.	350—2 x 4—18	
1—6 x 8—18		34—2 x 4—16	
1—6 x 8—36		12—2 x 4—20	
2—6 x 8—20		15—2 x 4—12	
4—6 x 8—12		100—2 x 4—20	
1—6 x 8—26		100—2 x 4—16	
68—2 x 8—16	JOIST.	2200 feet Surfaced No. 2 Common Fencing.	
24—2 x 8—20			
30—2 x 8—12			
10—2 x 8—14			

Total Common Lumber, 13478 ft. at $15.00	$202 00
Portico Material	75 00
30 Windows at $10.00	300 00
20 Transoms at $5.00	100 00
18 Doors at $7.00	126 00
10000 Redwood Shingles, at $6.00	60 00
2300 feet Siding, at $20.00	46 00
6500 " D. & M. No. 1 fencing, at $16.00	104 00
Clear, 3000 feet, at $40.00	120 00
Finishing Lumber Otherwise	80 00
Maple Flooring	10 00
Wainscoting and Ceiling	25 00
Total Lumber	$1248 00

GENERAL ESTIMATE.

Masonry	$ 804 00
Lumber	1248 00
Roofing (Bodine)	100 00
Hardware	75 00
Painting	175 00
Carpentry	400 00
Plumbing	175 00
Plans, Specifications and Details	60 00
Total	$3037 00

ESTIMATE OF DESIGN No. 16.

MASONRY.

150 yards Excavation, at 35c	$ 52 00
1450 Terra Cotta, or Hollow Tile Blocks, at 22½c	326 00
Fireplaces	15 00
32 feet Chimney, at $1.25	40 00
24 feet Chimney, at 75c	18 00
3 Mantels and setting, at $30.00	90 00
850 yards Acme Plastering, at 30c	255 00
Total Masonry	$796 00

LUMBER BILL.

2—6 x 8—28	SILLS.	210—2 x 4—20	STUDS.
5—6 x 8—16		60—2 x 4—16	
1—6 x 8—24		66—2 x 4—12	COLLARS.
1—6 x 8—36		40—2 x 4—16	PLATES, etc.
1—6 x 8—20		30—2 x 4—18	RAFTERS.
1—6 x 8—12		8—2 x 4—20	
132—2 x 8—12	JOIST.	12—2 x 4—12	
25—2 x 6—12		20—2 x 4—14	

2000 feet surfaced No. 2 Common 6 inch boards.

Total Common, 10600 feet, at $15.00	$159 00
26 Windows at $10.00	260 00
18 Doors at $7.00	126 00
Base	25 00
Finishing Lumber	80 00
Stairs	60 00
3800 feet Siding, at $20.00	76 00
6600 feet D. & M. No. 1 fencing, at $16.00	105 00
Maple Flooring	10 00
Wainscoting	10 00
Other Lumber	75 00
Porch Columns and Trimmings	25 00
Total Lumber	$1011 00

GENERAL ESTIMATE.

Masonry	$796 00
Lumber	1011 00
Carpentry	500 00
Hardware	80 00
Painting and Oil finishing	200 00
Roofing	200 00
Plumbing	175 00
Plans, Specifications and Details	60 00
Total	$3022 00

ESTIMATE OF DESIGN No. 17.

MASONRY.

144 yards excavation, at 35c	$ 50 00
1800 Terra Cotta, or Hollow Tile Blocks, at 22½c	396 00
43 feet Chimney at $1.00	43 00
20 feet Chimney at 75c	15 00
775 Yards Acme Plastering, at 30c	232 00
Total Masonry	$736 00

LUMBER BILL.

5—8 x 8—20 } SILLS.	7—2 x 6—12—JOIST.
2—4 x 6—20 } SILLS.	30—2 x 4—12 } COLLARS.
60—2 x 8—12 } JOIST.	18—2 x 4—14 } COLLARS.
36—2 x 8—14 } JOIST.	80—2 x 4—18—RAFTERS.
240—2 x 4—18 } STUDS.	8—2 x 6—12—DECK JOIST.
10—2 x 6—18 } STUDS.	50—2 x 4—16—ODDS.
20—2 x 4—16—PORCHES.	2000 feet surfaced No. 2 fencing.

Total Common, 9800 feet, at $16.00	$156 00
1200 feet Siding, at $20.00	24 00
1000 feet Ceiling, at $25.00	25 00
2000 feet Clear, at $40.00	80 00
27 Windows at $10.00	270 00
18 Doors at $7 00	126 00
5200 feet D. & M. No. 1 fencing, at $16.00	83 00
1000 Pattern Shingles, at $7.00	7 00
Maple Flooring	10 00
Mouldings	30 00
Finishing	30 00
Scrolls	20 00
Turned Work	30 00
Base	20 00
Paper	5 00
Rail and Stairs	60 00
Total Lumber	$976 00

GENERAL ESTIMATE.

Masonry	$736 00
Lumber	976 00
Roofing	195 00
Carpentry	700 00
Hardware	100 00
Painting	200 00
Plumbing	175 00
Plans, Specifications and Details	60 00
Total	$3182 00

ESTIMATE OF DESIGN No. 18.

MASONRY.

165 yards excavation, at 35c	$ 57 00
1400 Terra Cotta, or Hollow Tile Blocks, at 25c	350 00
36 feet Chimney at $1.25; 20 feet at $1.00	65 00
900 Yards Plastering at 35c	315 00
Total Masonry	$787 00

LUMBER BILL.

3—8 x 8—24	SILLS.	125—2 x 8—14	JOIST.
4—6 x 8—14		20—2 x 8—16	
1—6 x 8—18		22—2 x 6—24	COLLARS.
210—2 x 4—18	STUDS.	12—2 x 4—14	
150—2 x 4—16		50—2 x 4—16	ODDS.
30—2 x 6—18	RAFTERS.	10—2 x 6—16	
16—2 x 4—14		1800 sur. 6 inch 2 common.	

Total Common, 11612, at $16.00	$185 00
3600 feet B. Siding, at $20.00	72 00
6000 feet D. & M. No. 1 fencing, at $16.00	96 00
Turned work, etc	25 00
Clear Lumber	80 00
600 feet Ceiling, at $30.00	18 00
Base	30 00
Mouldings	30 00
3000 Pattern Shingles, at $7.00	21 00
26 Windows at $10.00	260 00
20 Doors at $7.00	140 00
Total Lumber	$957 00

GENERAL ESTIMATE.

Masonry	$787 00
Lumber	957 00
Carpentry	300 00
Hardware	75 00
Plumbing	175 00
Painting	150 00
Roofing	90 00
Plans, Specifications, etc	48 00
Total	$2582 00

ESTIMATE OF DESIGN No. 16.

MASONRY.

150 yards of excavation, at 35c	$ 52 00
1325 Terra Cotta, or Hollow Tile Blocks, at 22½c	298 00
4 Fireplaces, at $10.00	40 00
4 Mantels, at $30.00	120 00
118 feet Chimney, at $1.00	118 00
1000 yards Acme Plastering, at 30c	300 00
Other Masonry	25 00
Total Masonry	$953 00

LUMBER BILL.

11800 feet Common and peice stuff, at $15.00	$177 00
35 Windows at $10.00	350 00
20 Doors at $7.00	140 00
2 Sliding Doors	40 00
Base	35 00
Stairs	80 00
Portico Material	100 00
8000 feet No. 1 D. & M. fencing, at $16.00	128 00
4200 feet Siding, at $20.00	84 00
3000 Clear, at $40.00	120 00
Mouldings, etc	50 00
Total Lumber	$1304 00

GENERAL ESTIMATE.

Masonry	$953 00
Lumber	1304 00
Hardware	100 00
Cresting	25 00
Painting	225 00
Plumbing	175 00
Carpentry	500 00
Roofing, Bodine	100 00
Plans, Specifications and Details	65 00
Total	$3447 00

ESTIMATE OF DESIGN No. 20.

MASONRY.

160 yards of excavation, at 35c	$ 56 00
1700 Terra Cotta, or Hollow Tile Blocks, at 22½c	382 00
3 Mantels, at $30.00	90 00
3 Fireplaces	15 00
38 feet Chimney, at $1.25	47 00
18 feet Chimney, at 75c	13 00
1140 yards Acme Plastering	342 00
Total Masonry	$945 00

LUMBER BILL.

320—2 x 4—20	STUDS.	2—6 x 8—26	SILLS.
100—2 x 4—16		2—6 x 8—28	
30—2 x 4—12		1—6 x 8—22	
86—2 x 8—12	JOIST.	4—6 x 8—12	
35—2 x 8—14		2—6 x 8—16	
15—2 x 6—16		2—4 x 6—16	
44—2 x 4—12	COLLARS.	2400 feet surfaced No. 2 6 inch fencing.	
18—2 x 4—14			
18—2 x 4—16			

Total Common, 11400 feet, at $15.00	$171 00
31 Windows at $10.00	310 00
19 Doors at $7.00	133 00
Base	25 00
9000 feet No. 2 D. & M. fencing, at $16.00	144 00
2000 feet Clear, 4th grade, at $40.00	80 00
Wainscoting and Ceiling	20 00
Maple Flooring	10 00
Steps, etc	20 00
Turned work and Scrolls	30 00
Stairs	60 00
Other Lumber	100 00
Total Lumber	$1103 00

GENERAL ESTIMATE.

Masonry	$945 00
Lumber	1103 00
Carpentry	600 00
Painting	250 00
Hardware	100 00
Plumbing	175 00
Roofing, 24 sq. at $9.00	212 00
Plans, Specifications and details	65 00
Total	$3450 00

ESTIMATE OF DESIGN No. 21.

MASONRY.

150 yards excavation, at 35c	$ 52 00
1600 Terra Cotta, or Hollow Tile Blocks, at 22½c	360 00
1 Fireplace	5 00
1 Mantel	30 00
36 feet Chimney, at $1.25	45 00
18 feet Chimney, at 75c	13 00
960 yards Acme Plastering, at 30c	288 00
Total Masonry	$793 00

LUMBER BILL.

1—6 x 8—30	SILLS.	76—2 x 8—14	JOIST.
3—6 x 8—16		31—2 x 8—16	
1—6 x 8—28		12—2 x 6—16	
2—6 x 8—12		332—2 x 4—20	STUDS.
3—6 x 8—14		100—2 x 4—16	
1—6 x 8—20		38—2 x 4—14	
1—6 x 8—18		20—2 x 4—16	COLLARS.
58—2 x 4—14	RAFTERS.	60—2 x 4—16	PLATES, etc.
20—2 x 4—16		2500 feet surfaced No. 2 6 inch fencing.	
20—2 x 4—18			

Total Common	$212 00
20000 Pattern Shingles, at $6.00	120 00
1800 feet Siding, at $20.00	36 00
8000 No. 1 D. & M. Fencing, at $16.00	128 00
Mouldings and Finishing	200 00
36 Window Frames, Sash, etc., at $10.00	360 00
20 Doors at $7.00	140 00
2 Sliding Doors, at $20.00	40 00
Other Lumber	150 00
Total Lumber	$1386 00

GENERAL ESTIMATE.

Masonry	$793 00
Lumber	1386 00
Carpentry	700 00
Hardware	100 00
Roofing, 25 squares at $8.00	200 00
Painting and Oil Finish	200 00
Plumbing	175 00
Plans, Specifications and Details	70 00
Total	$3624 00

ESTIMATE OF DESIGN No. 22.

MASONRY.

150 yards of excavation, at 35c	$ 52 00
1900 Terra Cotta, or Hollow Tile Blocks, at 22½c	427 00
4 Fireplaces, at $5.00	20 00
4 Mantels, at $75.00	300 00
76 feet Chimney, at $1.50	114 00
38 feet Front Chimney, at $4.00	152 00
1100 yards Acme Plastering, at 30c	330 00
Other Masonry	40 00
Total Masonry	$1435 00

LUMBER BILL.

1—6 x 8—28	SILLS.	64—2 x 10—14	JOIST.
2—6 x 8—30		48—2 x 10—12	
4—6 x 8—18		40—2 x 10—16	
2—6 x 8—16		24—2 x 8—16	
4—6 x 8—12		32—2 x 6—14	COLLARS.
160—2 x 6—22	STUDS &	24—2 x 6—12	
200—2 x 4—20	PLATES.	20—2 x 6—16	
50—2 x 6—20	RAFTERS.	100—2 x 4—16	ODDS.
50—2 x 4—14		3600 feet surfaced No. 2 fencing.	
50—2 x 4—12			

Total Common, 17000 feet, at $15.00	$255 00
Clear Lumber	200 00
Stairs	100 00
40 Windows, at $10.00	400 00
25 Doors, at $10.00	250 00
Portico Material	50 00
Cornice Brackets and Material	100 00
3 sets of Sliding Doors, at $20.00	60 00
Maple Flooring	20 00
6000 feet D. & M. No. 1 Fencing, at $16.00	96 00
1800 feet Siding, at $20.00	36 00
9000 Pattern Shingles, at $7.00	63 00
Other unenumerated lumber	150 00
Total Lumber	$1680 00

GENERAL ESTIMATE.

Masonry	$1435 00
Lumber	1680 00
Hardware	100 00
Roofing (Tin Shingle)	325 00
Painting	300 00
Plumbing	200 00
Carpentry	800 00
Plans, Specifications and Details	90 00
Total	$4930 00

ESTIMATE OF DESIGN No. 23.

MASONRY.

115 yards excavation, at 35c	$ 40 00
1100 Terra Cotta, or Hollow Tile Blocks, at 22½c	275 00
25 feet Chimney, at $1.50	38 00
Other Masonry	20 00
625 yards Plastering, at 35c	218 00
Total Masonry	$591 00

LUMBER BILL.

3—6 x 8—26	SILLS.	40—2 x 8—16	JOIST.
1—6 x 8—30		40—2 x 8—14	
2—6 x 8—18		40—2 x 4—12	COLLARS.
1—6 x 8—16		50—2 x 4—16	ODDS.
1—6 x 8—14		70—2 x 4—12	STUDS.
32—2 x 6—18	RAFTERS.	80—2 x 4—16	
30—2 x 4—16		1500 sur. 6 in. No. 2 fencing.	

Total Common, 6736 feet, at $16.00	$107 00
3000 Pattern Shingles, at $7.00	21 00
5000 Ceiling, at 30c	15 00
1500 Clear, at $40.00	60 00
1800 B. Siding, at $20.00	36 00
4500 D. & M. No. 1 fencing, at $16.00	72 00
28 Windows at $10.00	280 00
17 Doors at $7.00	119 00
Porch Material	25 00
Base, etc	30 00
Stairs	50 00
Total Lumber	$815 00

GENERAL ESTIMATE.

Masonry	$591 00
Lumber	815 00
Carpentry	350 00
Hardware	60 00
Painting	125 00
Roofing	75 00
Plumbing	175 00
Plans and Specifications	48 00
Total	$2239 00

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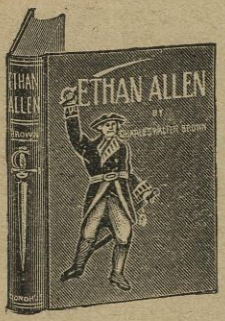

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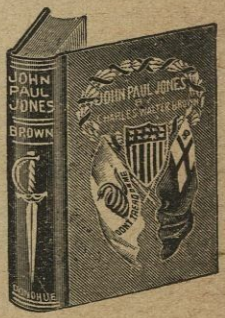

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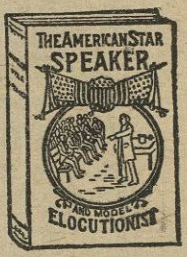

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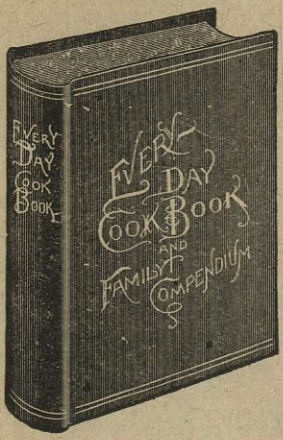

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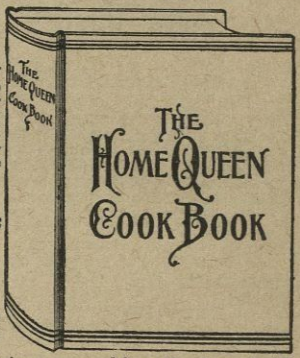

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